PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY

HELD AT PHILADELPHIA

FOR

PROMOTING USEFUL KNOWLEDGE.

Vol. XXX.

JANUARY TO DECEMBER, 1892

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AMERICAN PHILOSOPHICAL SOCIETY,

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Vol. XXIII. JANUARY, 1886. No. 187.

TABLE OF CONTENTS.

PAGE.

Stated Meeting, January 1, 1886 1

The Temperate and Alpine Floras of the Giant Volcanoes of Mexico. *By Prof. Angelo Heilprin* 4

Observations on the Otomanic Language of Mexico. *By Prof. Daniel G. Brinton, M.D.* 28

On the Mazatec Language of Mexico and its Affinities. *By Prof. Daniel G. Brinton, M.D.* 31

On the Synonymy of the Genus Emys. C. Dumeril. *By Prof. Dr. ...* 45

Names in South American Native Languages. *By Prof. Daniel G. Brinton, M.D.* 48

Stated Meeting, January 15, 1886 106

Stated Meeting, February 5, 1886 110

Stated Meeting, February 19, 1886 113

Stated Meeting, March 5, 1886 117

Stated Meeting, March 19, 1886 120

A Contribution to the Vertebrate Paleontology of Texas. *By Prof. E. D. Cope* 120

On Amphirus, a New Genus of Teleosts (with a plate). *By Prof. E. D. Cope* 130

☞ It is requested that the receipt of this number be acknowledged.

☞ In order to secure prompt attention it is requested that all correspondence be addressed simply "To the Secretaries of the American Philosophical Society, 104 S. Fifth St., Philadelphia."

PUBLISHED FOR THE AMERICAN PHILOSOPHICAL SOCIETY

BY

MacCALLA & COMPANY,

[illegible]

EXTRACT FROM THE LAWS.

The Henry M. Phillips' Prize Essay Fund.

Miss Emily Phillips, of Philadelphia, a sister of Hon. Henry M. Phillips, deceased, presented to the American Philosophical Society, held at Philadelphia for Promoting Useful Knowledge, on October 5, 1888, the sum of five thousand dollars for the establishment and endowment of a Prize Fund, in memory of her deceased brother, who was an honored member of the Society. The Society, at a stated meeting, held October 5, 1888, accepted the gift and agreed to make suitable rules and regulations to carry out the wishes of the donor, and to discharge the duties confided to it. In furtherance whereof, the following rules and regulations were adopted by the Society at a stated meeting held on the seventh day of December, A.D. 1888:

First. The Prize Endowment Fund shall be called the "Henry M. Phillips' Prize Essay Fund."

Second. The money constituting the Endowment Fund, *viz.*, five thousand dollars, shall be invested by the Society in such securities as may be recognized by the laws of Pennsylvania, as proper for the investment of trust funds, and the evidences of such investment shall be made in the name of the Society as Trustee of the Henry M. Phillips' Prize Essay Fund.

Third. The income arising from such investment shall be appropriated as follows:

(*a*) To making public advertisement of the prize and the sum or amount in United States gold coin, and the terms on which it shall be awarded.

(*b*) To the payment of such prize or prizes as may from time to

PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY,

HELD AT PHILADELPHIA, FOR PROMOTING USEFUL KNOWLEDGE.

VOL. XXX. JANUARY, 1892. No. 137.

Stated Meeting, January 1, 1892.

Present, 9 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

Letters of acknowledgment from the Institut Egyptien, Cairo (134); Museum Teyler, Harlem, Holland (135).

A photograph for the Society's Album was received from Prof. Albert H. Smyth, Philadelphia.

Accessions to the Library were reported from the Académie des Sciences, Cracow, Austria; Naturwissenschaftliche Verein des Reg.-Bez. Frankfurt, Germany; Hydrographische Amt des Reichs-Marine-Amts, Messrs. Friedländer und Sohn, Berlin; Gartenbauverein, Darmstadt; Deutsche Gesellschaft für Anthropologie, Ethnologie, etc., Munich; Société Hollandaise des Sciences, Harlem, Holland; Biblioteca N. C., Florence, Italy; R. Accademia dei Lincei, Biblioteca N. C. V. E., Rome; Société Americaine de France, Société de Geographié, Rédaction "Cosmos," Paris, France; Philological Society, Cambridge, England; Royal Astronomical, Meteorological, Geographical Societies, Lords Commissioners of the Admiralty, "Nature," London; Manchester Geographical Society; Theological Seminary, Andover, Mass.; American Statistical Association, Dr. William Elliot Griffis, Boston, Mass.; Museum of Comparative Zoölogy, Cambridge, Mass.;

Newport Sanitary Protection Association; Hartford Theological Seminary, Travellers Insurance Co., Hartford, Conn.; Yale University, Prof. H. A. Newton, New Haven, Conn.; University of the State of New York, Albany; Cornell University, Ithaca, N. Y.; American Chemical Society, Historical Society, Meteorological Observatory, New York; College of Pharmacy, Messrs. Lea Brothers & Co., Editor of the "Medical and Surgical Reporter," Editor of "Pennsylvania County Court Reports," Prof. E. D. Cope, Philadelphia; Johns Hopkins University, Editor of the "American Journal of Philology," Baltimore, Md.; Department of State, Washington, D. C.; Agricultural Experiment Stations, Morgantown, W. Va., Experiment, Ga., Auburn, Ala., Raleigh, N. C., Lafayette, Ind., Corvallis, Oreg., Ames, Ia., Fort Collins, Colo., Berkeley, Cal.; Observatorio, Rio de Janeiro.

The following were reported as duly elected Officers and Councilors of the Society:

President.

Frederick Fraley.

Vice-Presidents.

E. Otis Kendall, W. S. W. Ruschenberger, J. P. Lesley.

Secretaries.

George F. Barker, Daniel G. Brinton, Henry Phillips, Jr., George H. Horn.

Curators.

Patterson Du Bois, J. Cheston Morris, R. Meade Bache.

Treasurer.

J. Sergeant Price.

Councilors.

Richard Wood, William V. McKean, Richard Vaux,
Isaac C. Martindale.

Councilor for two years, vice Aubrey H. Smith, deceased.

William P. Tatham.

The report of the Finance Committee was presented, and the appropriations for the year ending November 30, 1892, passed.

Nominations for Librarian being in order, Dr. Morris re-nominated Mr. Henry Phillips, Jr., and Prof. Cope nominated Mr. B. S. Lyman, and the nominations were closed.

Pending nomination for membership 1232 and new nomination 1233 were read.

Prof. Cope offered for the Transactions a paper entitled "A Synopsis of the species Tied, genus Cnemidophorus."

On motion, the paper was referred to a Committee, to be appointed by the President at his leisure.*

Prof. Cope presented for the Proceedings a paper by Prof. George Baur (of Worcester, Mass.), on the "Taxonomy of the genus Emys, C. Dumeril."

Curator Morris exhibited a variety of objects from the cabinets of the Society.

Dr. Cope suggested that when a paper is presented through a member of the Society for publication, in case of its non-acceptance, it should be returned to the member offering the same, and not sent to its author.

And the Society was adjourned by the President.

* The President subsequently appointed as such Committee, Drs. Ryder, Jayne and Sharp.

The Temperate and Alpine Floras of the Giant Volcanoes of Mexico.
(*Being a Report from the Committee on the Michaux Legacy.*)

By Prof. Angelo Heilprin.

(*Read before the American Philosophical Society, January 15, 1892.*)

Hemsley, in the fourth volume of his report on the botany of Mexico nd Central America, enumerates 130 species of flowering plants, exclusive of sedges and grasses, which reach or pass beyond the 10,000-foot line on the slopes of the four principal volcanoes of the Mexican Republic—Orizaba, Popocatepetl, Ixtaccihuatl and the Nevado de Toluca.* This enumeration is based mainly upon the data found on the labels of the various collections illustrating the region, and omits passing citations; it is thus, necessarily, to an extent incomplete, but yet it is an admirable survey of the general features of this upper flora. To Hemsley's list the following species enumerated by Liebmann as occurring on Orizaba can, I think, be safely added,† although possibly a few of the species require redetermination before their position or synonymy can be satisfactorily established.

	FEET.
Ranunculus Hookeri	10,000
Ranunculus llaveanus	10,000
Cerastium sp.?	14,000
Arenaria decussata	10,000
Arenaria leptophylla?	12,000
Oxalis latifolia	10,000
Trifolium amabile	10,000
Lupinus leptophyllus	10,000
Fragaria Mexicana	10,000
Potentilla sp.?	14,000
Alchemilla venusta	10,000
Alchemilla vulcanica	10,000
Alchemilla hirsuta	10,000
Echeveria mucronata	10,000
Sedum sp.?	10,000
Epilobium repens	10,000
Mentha sp.?	10,000
Gaura sp.?	10,000
Pimpinella sp.?	10,000
Dauca montana	10,000
Hydrocotyle Mexicana	10,000
Eryngium sp.?	14,000

* "A Specimen of the Mountain Flora of South Mexico and Central America—Biologia Centrali-Americana," "Botany," iv, pp. 282–298, 1887.

† "Vegetation des Piks von Orizaba," *Botanische Zeitung*, 1844: also translated and abridged in Hemsley's Report, iv, pp. 145–150.

	FEET.
Sesseli sp.?	12,000
Œnanthe sp.?	12,000
Viburnum sp.?	10,000
Cornus sp.?	10,000
Stevia arbutifolia	12,000
Erigeron scaposus (Aster rivularis)	10,000
Bidens sp.?	10,000
Dahlia variabilis	10,000
Chrysanthemum (?) sagetum	10,000
Cnicus Jorullensis	10,000
Hieracium abscissum	10,000
Tagetes clandestina	10,000
Baccharis Jalapensis	10,000
Diodia sp.?	10,000
Gaultheria procumbens	10,000
Pernettya (Gaultheria) ciliata	14,000
Phacelia sp.?	14,000
Solanum stoloniferum	10,000
Lamourouxia Jalapensis	9,500
Pinguicula sp.?	10,000
Castilleja integrifolia	10,000
Castilleja scorzonerifolia	10,000
Castilleja sp.?	14,000
Verbena pulchella	10,000
Prunella vulgaris	10,000
Plantago Mexicana	10,000
Juniperus Mexicana	14,000
Govenia speciosa	9,500
Spiranthes sp.?	10,000
Serapias sp.?	10,000
Tigridia pavonia	10,000
Tillandsia sp.?	10,000
Bomarea hirtella	10,000
Agave sp.?	10,000

The approximate elevations as recorded by Liebmann are, with little doubt, given in French feet. This placing does not materially alter the positions of the plants in question. To Liebmann's list I would add the following, obtained by myself and my associates during a recent exploration of the Mexican volcanoes (1890):

	FEET.
Echeveria gibbiflora? (or E. secunda?) on Ixtaccihuatl	14,200
Œnothera tetraptera on Ixtaccihuatl and Popocatepetl	11,000–11,500
Symphoricarpus microphyllus on Popocatepetl	10,500
Lonicera filosa on Popocatepetl	10,500

	FEET.
Erigeron maximus on Popocatepetl	11,200
Baccharis concava on Popocatepetl	11,000
Gnaphalium oxyphyllum on Orizaba	13,500
Senecio salignus on Ixtaccihuatl	13,200
Arbutus spinulosus on Popocatepetl	10,500
Alnus castanæfolia on Popocatepetl	10,500
Draba aretoides (?) on Ixtaccihuatl	13,200

A number of other plants, such as Habenaria prasina, Platanthera nubigena, P. longifolia, Malaxis gracilis (among orchids), have been cited by Martens and Galeotti from the peak of Orizaba, so that the total list is brought close up to 200 species. I have in the table that follows appended the approximate elevations at which the plants occur, relying largely upon the data furnished by Hemsley. The letters that precede the names of the species have reference to the special mountain peak upon which the plants were found: O., Orizaba; P., Popocatepetl; I., Ixtaccihuatl, and T., Nevado de Toluca. The author wishes in this connection to express his indebtedness for various forms of assistance to Messrs. Thomas Meehan, John H. Redfield, Isaac Burk and Witmer Stone, members of the Academy of Natural Sciences.

	To 10,000 FEET.	10–12,000 FEET.	12–13,000 FEET.	13–15,000 FEET.
O. Ranunculus geoides		9–12,000		
O. R. Peruvianus			12,500	
O. R. Hookeri	10,000			
O. R. llaveanus	10,000			
O. R. sp.?				14,000
O. Nasturtium impatiens		11–12,000		
O. " Orizabæ		12,000		
O. Draba myosotidioides			12–13,000	
P. " Popocatepetlensis		12,000		
T. " Tolucensis				8–14,000
I. " aretoides? (also O.)				13,200
O. Sisymbrium canescens		12,000		
O. " Galeottianum.		8–11,000		
T. Erysimum macradenium			12–13,000	
O. Viola ciliata	10,000			
O. " sp.?				14,000
T. Cerastium andinum			13,000	
O. " orithales		12,000		
O. " vulcanicum		10–12,000		
O. " sp.?				14,000
O. Arenaria alsinoides		10–12,000		
O. " decussata	10,000			
O. " bryoides			12,500	

	To 10,000 FEET.	10–12,000 FEET.	12–13,000 FEET.	13–15,000 FEET.
T. Arenaria bryoides				14–15,000
P. " "		11,500		
O. " leptophylla? ...		12,000		
O. Colobanthus Quitensis....		12,500		
O. Oxalis latifolia	10,000			
T. Geranium potentillæfolium	9–10,000			
O. Trifolium amabile.....	10,000			
T. Lupinus bimaculatus		12,000		
O. " elegans	9–10,000			
O. " glabellus.....	9–10,000			
P. " Mexicanus.....		10–11,000		
T. " montanus	9–10,000			
O. " vaginatus		12,000		
P. " "		12,000		
T. " "		12,000		
I. " "		12,000		
O. " leptophyllus.....	10,000			
O. Fragaria Mexicana.....	10,000			
O. Spiræa discolor.....		10–12,000		
O. Rubus trilobus.....	10,000			
O. Potentilla ranunculoides..		12,000		
O. " Richardii			12,500	
O. " sp.?				14,000
O. Alchemilla orbiculata.....		12,000		
O. " Sibbaldiæfolia.		9–12,000		
O. " venusta	10,000			
O. " tripartita	10,000			
O. " vulcanica.....	10,000			
O. " hirsuta	10,000			
O. Acæna elongata.....				14,000
O. Heuchera Orizabensis....			11–12,500	
P. Ribes Jorullensis		10–12,000		
T. " "		10–12,000		
O. " "				13,500
O. Echeveria mucronata.....	10,000			
I. " gibbiflora? (E. secunda?)				14,200
O. Sedum sp.?.....	10,000			
P. Œnothera tetraptera		11–12,000		
I. " "		11–12,000		
O. Epilobium repens.....	10,000			
O. Mentha sp.?	10,000			
P. Fuchsia microphylla.....	10,000			
O. " mixta	10,000			

	To 10,000 FEET.	10-12,000 FEET.	12-13,000 FEET.	13-15,000 FEET.
O. Gaura sp.?	10,000			
O. Lopezia hirsuta	10,000			
O. Microsechium ruderale	9-10,000			
O. Pimpinella sp.?	10,000			
O. Dancus montana	10,000			
O. Hydrocotyle Mexicana	10,000			
O. Eryngium eymosum	8-10,000			
O. " protæflorum		12,000		
T. Tauschia Coulteri		10,500		
O. Sesseli sp.?		12,000		
O. Œnanthe sp.?		12,000		
O. Ottoa œnanthoides		12,000		
O. Peucedanum Tolucense			12,500	
O. Viburnum sp.?	10,000			
O. Cornus sp.?	10,000			
O. Abelia floribunda	10,000			
P. Symphoricarpus microphyllus		10,500		
P. Lonicera filosa		10,500		
O. Galium gemmiflorum	10,000			
O. Didymæa Mexicana	10,000			
O. Ageratum adscendens		10-11,500		
O. " arbutifolium				13,500
P. " "		11,000		
I. " "				13,200
O. Stevia monardiæfolia		8-12,000		
O. " arbutifolia		12,000		
O. Eupatorium adenochætum	8-10,000			
O. " grandidentatum	10,000			
O. " Orizabæ		10-11,000		
O. Haplopappus stoloniferus		8-12,000		
O. Chionolæna lavandulacea.				12,500-15,000
I. " "				13,200
O. Gnaphalium oxyphyllum.				14,000
O. Sabazia sarmentosa		9-11,000		
O. Achillea millefolium	10,000			
P. Baccharis concava		11,000		
O. Erigeron scaposus	10,000			
P. " maximus		11,200		
O. Senecio chrysactis			12-13,000	
I. " "				13,200
O. " cirsioides				14,000
P. " Galeottii		11,500		

	To 10,000 FEET.	10–12,000 FEET.	12–13,000 FEET.	13–15,000 FEET.
O. Senecia Galeottii.....		12,000		
O. " gerberæfolius				10–15,000
O. " helodes.....		11,500		
O. " multidentatus			9–12,500	
O. " Orizabensis			10–12,500	
O. " procumbens.....				12–15,000
T. " "		10–11,000		
I. " salignus				13,200
O. Bidens sp.?.....	10,000			
O. Dahlia variabilis.....		10–11,000		
O. Chrysanthemum (?) sagetum	10,000			
T. Cnicus nivalis.....		11,400		
O. " "				14,000
O. " Jorullensis.....	10,000			
P. Hieracium Mexicanum ...	10,000			
O. " abscissum	10,000			
O. " niveopappum .			13,000	
O. " thyrsoideum ..		12,000		
O. Tagetes clandestina.....	10,000			
O. Lobelia nana			11–12,500	
O. " Orizabæ	9–10,000			
O. Diodia sp.?.....		11,000		
O. Gaultheria procumbens...	10,000			
O. Arctostaphylos pungens..			12–12,500	
P. Arbutus spinulosus		10,500		
O. Pernettyia pilosa		9–12,000		
O. " ciliata.....				14,000
O. Pyrola Sartorii	9–10,000			
O. " secunda.....	8–10,000			
O. Chimaphila umbellata....	6–10,000			
O. Buddleia lanceolata	10,000			
O. Halenia alata.....	9–10,000			
O. " nudicaulis		9–12,000		
O. " nutans.....	9–10,000			
O. " paucifolia		9–12,000		
O. Polemonium grandiflora..		9–12,000		
O. Cobæa minor.....	10,000			
P. Phacelia pimpinelloides ..	10,000			
O. " " ..			12,500	
I. " " ..				13,200
O. Echinospermum Mexicanum.....	10,000			
O. Lithospermum distichum.		11–12,000		

	To 10,000 FEET.	10-12,000 FEET.	12-13,000 FEET.	13-15,000 FEET.
O. Solanum verrucosum		10–12,000		
O. " stoloniferum?...	10,000			
O. Saracha umbellata.....	10,000			
O. Lamourouxia Jalapensis..	9,500			
O. Pinguicula sp.?.....	10,000			
O. Calceolaria Mexicana	10,000			
O. Pentstemon gentianoides .		9–12,000		
O. Mimulus glabratus.....			12–12,500	
O. " Orizabæ..... ...		10–12,000		
O. Veronica serpyllifolia				14,000
O. Castilleja lithospermoides.		12,000		
O. " pectinata.....		10–12,000		
O. " Tolucensis.....				13,200
T. " "				14,200
O. " integrifolia	10,000			
O. " scorzonerifolia ..	10,000			
O. Pedicularis Orizabæ.....		12,000		
O. Verbena teucrifolia		10,500		
O. " pulchella.....	10,000			
O. Salvia biserrata		9–10,500		
O. Scutellaria cœrulea	9–10,000			
O. Stachys repens		9–11,000		
O. Prunella vulgaris	10,000			
O. Plantago Mexicana	10,000			
O. Peperomia Lindeniana....	10,000			
O. Persea Orizabæ		7–10,500		
O. Arcenthobium campylopodum.....		10–11,000		
O. " cryptopodum.....		10–11,000		
O. " oxycedri ..		12,000		
O. Euphorbia Orizabæ	8-10,000			
O. Urtica chamædryoides....	10,000			
O. " spiralis.....	10,000			
O. Pilea vulcanica.....	10,000			
O. Parietaria Pennsylvanica .	10,000			
O. Alnus acuminata	7–10,000			
O. " Jorullensis		12,000		
P. " castanifolia.....		10,500		
O. Quercus floccosa.....	8–10,000			
O. " glabrescens.....	8–10,000			
O. " Orizabæ	8–10,000			
O. " reticulata.....	8–10,000			
O. Salix cana.....		11–12,000		

	To 10,000 FEET.	10–12,000 FEET.	12–13,000 FEET.	13–15,000 FEET.
O. Salix latifolia.....		12,000		
P. " paradoxa?.....		10,500		
O. Juniperus tetragona.....				12–14,000
O. " Mexicana.....				14,000
P. " "		11,500		
P. Pinus ayacahuite		11–12,000		
O. " "				13,500
P. " Hartwegii.....				13–14,000
O. " Montezumæ (also P. & I.).....				10–14,000
O. " patula		10–12,000		
O. Abies religiosa (also P. & I.).....		12,000		
O. Govenia speciosa.....	9,500			
O. Habenaria vulcanica.....		10–12,000		
O. " prasina.....			12,800	
O. Platanthera nubigena			12,500	
O. " longifolia			12,500	
O. Malaxis gracilis...			12,500	
O. Spiranthes ochracea			12,500	
O. Serapias sp.?	10,000			
O. Tigridia pavonia.....	10,000			
O. Tillandsia sp.?.....	10,000			
O. Sisyrinchium scabrum....	10,000			
O. Bomarea acutifolia	7–10,000			
O. " hirtella.....	10,000			
O. Agave sp.?.....	10,000			
O. Echeandra terniflora		11,000		
O. Allium glandulosum		9–12,000		
O. Stenanthium frigidum....			9–12,500	

From the preceding it will appear that, exclusive of grasses and sedges, there are approximately :

		FEET.
5	species which pass beyond.....	14,000
28	" " " "	13,000
46	" " " "	12,000
97	" " " "	11,000
115	" " " "	10,000
199	" " about reach or pass beyond.....	10,000

By far the greater number of the species enumerated in the preceding list are cited from the Citlaltepetl (the "Star Mountain"), or Peak of Orizaba, as it is commonly known, which, from the specially favorable conditions surrounding its position, has attracted the attention of botanists more than any other mountain of Mexico. With its base buried in the

luxuriant forests of the eastern *tierra caliente*, it presents an unbroken botanical front to the line of perpetual snow, 15,000 feet above the sea, and thus exhibits in beautiful sequence the different vegetal zones which climate more particularly has marked out. There is probably no other mountain in the world which so thoroughly presents the essentials of a study of mountain floras as Orizaba; the luxuriance of growth at its base, the high level to which the forest zone attains, and the isolation, due to volcanic structure, of the peak itself, are the specially distinguishing features of this summit. So far as the temperate and alpine floras of the other giant mountains of Mexico are concerned—Popocatepetl, Ixtaccihuatl and the Nevado de Toluca—there is no question that they are very closely related to the similar floras of the Star Mountain, as indeed it would naturally be expected they would be. Of this correspondence I have satisfied myself through a personal examination of the floras *in situ*; unfortunately, the conditions attending the ascent of these mountains were such as to prevent us from making more than "sample" collections, but they illustrate in a broad way the general features of the vegetation. All four summits rise from the table land through a zone of pine forest. On the western slope of Orizaba, or towards the town of San Andres Chalchicomula, we found the pines, with *Pinus Montezumæ* (var. *macrophylla*—the common long-leaved species), *P. Teocote* and *P. pseudostrobus*, to begin as a distinct zone, at an elevation of some 9000 feet, occupying nearly the same position on the western slopes of Popocatepetl and Toluca; on Ixtaccihuatl the line descends approximately 500 feet lower. There can be little question, it appears to me, that the limitation downward in these special cases is not so much dependent upon climatic conditions as it is upon certain physical peculiarities of the surroundings and the artificial means that have been resorted to for the removal of the native growth. The vast accumulation of ash and dust-sand which to-day envelopes the plateau base of the mountain, deposited as a disintegration downwash from above or as a wind sediment from below, lends itself at best to the development of but a scant vegetation; large areas are wholly barren, while others are redeemed only by a withered and scattered growth of grass and insignificant herbs. Over these lower areas trees are but distant ornaments. That this limitation of 9000 feet is not the actual or natural boundary of the pine zone is shown by the condition of the eastern face of the mountain, which descends from the plateau, or by the face of the plateau itself. Thus, on the hills about the town of Orizaba, at an elevation of some 4800 feet, we observed *Pinus pseudostrobus*—a form closely related to *P. Montezumæ*, and also entering into the composition of the lower pine woods of the Citlaltepetl—growing in great profusion; and on the steep southern face of the plateau descending to the volcano of Jorullo, we followed *Pinus Montezumæ* or *P. occidentalis* to the level of 4000 feet, or perhaps even lower—far below the upper level which the palms attain in certain parts of Mexico.*

* We observed a palmetto-like form, probably a Brahea, growing abundantly on the

The extended vertical distribution of the pines is very remarkable, not less so than the abrupt limitation southwards of the genus. If the identification of the common form of British Honduras and of Cuba (*Pinus Cubensis*) with *P. Montezumæ* (*P. occidentalis*) be considered correct—for which, however, there appears to be considerable doubt—and similarly, the identification of this last with the species (or one of the species) growing in the upper vegetal zone of Orizaba, etc., then the range of a single species is made coincident with that of the entire genus—indeed, so far as the western hemisphere is concerned, with that of the entire family or tribe. Nor is there, probably, another instance known of a perennial having an equivalent range of 14,000 feet, or upwards of two and a half miles.* Humboldt places the lower limit of *P. Montezumæ* in Mexico at 4092 feet (at very nearly the position in which I found it below Buena Vista on the road connecting Ario de Rosales with the hacienda of La Playa, base of Jorullo), and its upper limit, as determined by him on the Cofre di Perote, at 12,936 feet.† Liebmann places the upper limit, on the northwestern side of the Peak of Orizaba, still higher, or at about 14,000 feet.‡ I am not certain that we observed, whether on Orizaba, Popocatepetl, or Ixtaccihuatl, the common "long-leaved Mexican pine" at anything like this elevation; certain it is that while this species enters, with the *P. Teocote* and *P. pseudostrobus*, very largely into the formation of the *lower* pine woods of the mountains in question, at elevations of from 9000 to 11,000 feet or thereabouts, it is distinctly succeeded in the upper zone by the very common short-leaved form (*Pinus Ayacahuite*) and *P. Hartwegii*. That these various forms have been repeatedly interchanged by botanists and travelers is positive; nor, indeed, in the present uncertainty regarding the species of Mexican pines, would it be safe to assert that all these species are really distinct. We also found the upper limit of the pines on Orizaba to be close on the 14,000-foot line, but on the adjacent Sierra Negra, which faces the peak of Orizaba on the south, the tree line appears to rise fully two or three hundred feet higher. As Liebmann observes, the trees become in a measure dwarfed, though never shrubby or prostrate. At an elevation of 13,200 feet, where they

limestone mountains west of Yautepec (on the ridge separating that town from Cuernavaca), at an altitude of 6500 feet; the same species appears still higher, 7000–7500 feet, on the similar calcareous soil of the region about (north of) Tehuacan. At both localities the palm, together with the Viznaga (*Viznaga mammillaris*), and the organ cactus, forms the predominant feature of the vegetation; the stem rises to some 30–35 feet. Liebmann states that Corypha and Chamærops are both found on the highlands of Mexico at an elevation of 8000 feet. Hemsley is probably correct in referring one of these forms to Brahea; the other may be a Chamædorea, but it seems to me more likely to be a true Sabal. Drude has, perhaps, doubted the accuracy of Liebmann's observations, since he makes no mention of any Mexican palm rising above 5000 feet ("Die Geographische Verbreitung der Palmen," in "Petermann's Mittheilungen," 1878: "Handbuch der Pflanzengeographie," 1890).

*The Oregon pine or Douglas fir (*Pseudotsuga Douglasii*) extends its habitat from the sea level on the Pacific coast to an elevation of nearly 10,000 feet in Colorado.

† "Views of Nature," Bohn's edition, p. 315.

‡ If French feet, then more nearly 15,000 feet.

still formed groves or thickets, they rose to a height of certainly not less than 30–40 feet. Roezl, as quoted by De Candolle (Parlatore, in the "Prodromus," xvi, ii, p. 400), and Hemsley give, it appears to me, too great an elevation for the pines on Popocatepetl and Ixtaccihuatl, 13–14,000 feet; the first figure more nearly represents the true limitation. Felix and Lenk * delimit the zone on Popocatepetl at about 250 feet above the ranch of Tlamacas, or, according to their statement, at almost exactly 13,000 feet; my own observations place the line somewhat higher, 13,160 feet †—or about 100 feet lower than the point where we met with the last pines on Ixtaccihuatl.

At no other point on the earth's surface do the pines attain such an extreme elevation as on the Mexican volcanoes; indeed, if we except the *Juniperus fœtidissima* found by Thomson in the Spiti Valley, Himalayas, at an altitude of 15,000 feet, the entire group of the Coniferæ almost everywhere falls far below this line. Barring exceptional cases, the uppermost trees on the Himalaya, as in north temperate regions generally, are conifers, but these virtually cease at an elevation of some 12,000 feet,‡ although flowering plants continue for still 7000 feet higher. On Mt. Ararat, according to Drude, the uppermost trees are birches, poplars and willows, and not conifers, § the tree line on the northwestern face of that mountain being situated somewhat below 8400 feet. On the extinct volcanic summit of the San Francisco mountain (Northcentral Arizona, lat. 35° 20′), with an elevation of 12,794 feet, Hart Merriam found the timber line at approximately 11,500 feet, marked by the disappearance of the fox-tail pine (*Pinus aristata*) and Engelmann's spruce (*Picea Engelmanni*). A somewhat higher level is, perhaps, reached by the balsam (*Abies subalpina*) in Colorado—12,000 feet. ‖

The point of most interest that suggests itself in connection with the distribution of the Mexican pines is the distinctness of the forms from those occurring in the region lying to the north. With barely an exception ¶ all the species occurring on the lofty volcanoes are endemic to the Mexican (Centrali-American) region, and are consequently not found in the pine tracts of the Rocky Mountain system. In view of the longitudinal

* "Beiträge zur Geologie and Paläontologie der Republik Mexico," p. 20, 1890.

† It is interesting to note in this connection that Von Gerolt, who made the ascent of Popocatepetl in 1833, places the *limit of vegetation* on that mountain at 12,614 (English) feet, not including "a mossy plant, *Arenaria bryoides*, which is occasionally found some hundred feet higher." Egloffstein, "Geology and Physical Geography of Mexico," 1864, p. 25.

‡ Schlagintweit observed the last groups or "woods" of these trees at an elevation of 11,800 feet, although cultivated specimens of *Populus Euphratica*, grown in the gardens of the monastery of Mángnang, were found nearly 2000 feet higher, at 13,460 feet ("Sitzungsber. Münch. Akad.," 1865, i, p. 258). This investigator places the limit of Phanerogams on the Gunshaukar Peak (lat. 31° 23′, long. 80° 18′) at 19,237 feet (*op. cit.*, 1867, p. 516; also in "Results of a Scientific Mission to India and High Asia").

§ "Handbuch der Pflanzengeographie," p. 402.

‖ C. S. Sargent, "The Woods of the United States," p. 132, 1885.

¶ *Pinus cembroides* ranges into the Santa Catalina mountains of Arizona (3500 feet elevation).

direction of these mountains and the fact that they are continued by a plateau system of elevations of from 6000–8000 feet into the very heart of the volcanic area, this circumstance appears a little remarkable; its explanation is possibly to be sought in the same series of conditions which have determined the endemic character of the alpine flora generally of the Mexican and South American summits. In the case of such hardy perennials as the pines, however, it is more difficult to account for the anomaly than in that of the seemingly much more pliable herbaceous plants, which are commonly assumed to lend themselves more readily to changes or modifications as the result of alterations in the physical conditions of their surroundings. The comparatively recent origin of the Mexican volcanoes proves that the floras which they carry must be of equally recent date; it follows, therefore, as a corollary that if the components of these floras are derivatives from preëxisting floras still extant, such modifications of structure as they have undergone must have been rapid in their formation—more rapid, probably, than is generally allowed for modifications of this kind. Can it, perhaps, be assumed that the special characteristics and conditions which belong to elevated volcanic cones are conducive to rapid change? It is true that not all the volcanic summits of Mexico are of equivalent age, and it can probably be assumed that some are of even considerably greater age than others (although possibly belonging to the same period of geological time); thus the worn-off and effaced summit of the Ixtaccihuatl, without doubt, long antedates such perfect cones as Orizaba and Popocatepetl; and the serrated ridges of the Ajusco, or their continuations, bear a similar relation to the series of more or less perfect cones and bosses which are distributed over the plateau north of the line occupied by them. Possibly the existing flora was first developed on such ancient slopes, whence by a gradual transference it gained the position which it now holds (largely modified and altered in form).

It must be admitted, however, that our knowledge on these points is still so limited that it can scarcely originate more than speculation or surmise; it no more explains the present problem than it answers the question: Why are the pines limited to the northern hemisphere—or more definitely, why the North American pines cease so abruptly in Nicaragua? What are the special conditions which prevent them from spreading further southward, and why is the upper zone of the Andes destitute of these trees? Indeed, the endemic character of the Mexican conifers and the absence of their immediate representative in South America might suggest to some an origination wholly independent of a true North American stock—an origination suggestive of a former Atlantis. The presence of pines in some of the West Indian islands—Cuba, Jamaica, Santo Domingo, and again in the Canary Islands*—might, moreover, be taken in evidence of a trans-Atlantic land connection having actually

* *Pinus Canariensis*, the last of the three-leaved pines from the western region of the Old World.

existed at a comparatively modern period. Botanists have, indeed, long since pointed out the relation existing between the modern coniferous flora of North America and the equivalent Miocene flora of Europe—a relationship which might almost be considered an equivalency—and have even hinted at the possible derivation of the one from the other.*

The singular distribution of the pines makes it certain that neither their vertical nor their horizontal (or longitudinal) range is determined by conditions of temperature alone, or, perhaps, even primarily. Humboldt has plainly stated this fact: "This absence from the southern hemisphere of the true Abietineæ, of the Juniperineæ, Cupressineæ and all the Taxodineæ, as likewise of the Torreya, of the *Salisburia adiantifolia*, and of the Cephalotaxus among the Taxineæ, vividly reminds us of the enigmatical and still obscure conditions which determined the original distribution of vegetable forms. This distribution can by no means be satisfactorily explained, either by the similarity or diversity of the soil, by thermal relations, or by meteorological conditions."† Mr. Thomas Meehan has repeatedly insisted that the timber line on mountains is not essentially a fixture determined by climate, but depending more particularly upon special topographic features of the surroundings—the character of the soil, amount of downwash, exposure to storms, etc. The critical comparison of different timber lines, taken in conjunction with vertical distribution, shows that this contention is at least largely true. The abrupt termination of the forest on some of our mountain heights, whether high or low—as for example on the Rocky Mountains or on Mt. Katahdin—and the continuance of trees of still noble proportions practically to the very limits of disappearance, point very strongly to this conclusion, a conclusion which is further supported by the reappearance in many places (of the same region) of the identical forest in positions considerably more elevated (and presumably much better adapted to a special development). The irregular height to which the "Waldregion" attains on the Alps and on other mountains of Southcentral Europe is certainly attributable at least as much to topographic (physiographic) as to climatic conditions. Thus, on the main body of the Central Alps (46°–47° N. lat.), the limit of trees is found at approximately 6400 feet; in the Southern Alps of Dauphiné (45° N. lat.), at 8200 feet (in places only 5550 feet); on the Illyrian Alps, of Karst, Austria (46° N. lat.), at 5000 feet, and on the Dinaric Alps of Bosnia (44° N. lat.), at 5300 feet. So, again, on the Jura mountains, in lat. 47°, this limit is reached at 4900 feet, whereas on the Altai, in lat. 50°, it rises nearly 1500 feet higher, or to 6400 feet. ‡

The limitation to height of herbaceous plants parallels the history presented by trees. It is generally assumed in their case that the line of

* Hildebrand, "Die Verbreitung der Coniferen," "Verhandl. d. natur. Vereines der preuss. Rheinlande und Westphalens," xviii, p. 377, 1861.

† "Physiognomy of Plants," in "Views of Nature," p. 321, Bohn edition, 1850.

‡ Grisebach, "Vegetation der Erde," I, pp. 180 *et seq.*, 1884.

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perpetual snow is the determinant of absolute or greatest elevation, but this is not strictly the case. Thus, it is well known that in the Swiss Alps phanerogamic plants are found nearly 2700 feet above the snow line; the beautiful mountain pink (*Silene acaulis*) has been met with at an elevation of 11,382 feet,* and *Androsace glacialis*, a primulaceous plant, at 11,406 feet, on the Piz Linard (Grisons). Indeed, Heer has determined not less than a hundred species (or approximately that number) of flowering plants (representing twenty-three families) as growing on the Rhætic Alps above the snow line (9060 feet), and Martius has recorded twenty-four species from the Grands Mulets, Mont Blanc, on elevations ranging from 10,540 to 11,300 feet.†

So far as the Mexican summits are concerned, I think it may be safely asserted that the tree or timber line is not an absolute one; in other words it is not one which is determined by the natural conditions of growth of the plant itself, but rather it is dependent upon purely local causes. It is scarcely conceivable, for example, that on Orazaba, where at an elevation of upwards of 13,200 feet the trees were still 30–40 feet in height, an additional 500–600 feet should so materially alter favorable (climatic) conditions of growth into unfavorable ones as to produce extermination; indeed, we must assume that this change is even much more rapid, for at the very verge of the timber line the pines, although necessarily harboring a considerable number of small specimens, still easily measured 20–30 feet. This condition we found repeated on Popocatepetl and Ixtaccihuatl, most markedly, perhaps, on the latter mountain; I am positive that some of the uppermost pines here, very close to the disappearing line, were not less than 40–50 feet high, if not higher. Again, on Popocatepetl, as has already been remarked, the timber line ceases a little above 13,100 feet, the trees themselves being of rather inconsiderable height. On an equivalent height on a spur of the Sierra Tlamacas,‡ however, the pines are still noble foresters, and on the Sierra Tlamacas itself, off in the direction of Ixtaccihuatl, they rise to elevations several hundred feet higher. There is little doubt in my mind that the actual limitation on the summits here referred to is mainly determined by such physiographic conditions as steepness of slope, downwash of soil, exposure to the cold waters of melting snows, storms, etc. How much higher, under more favorable conditions, the tree line might have attained, I am unable to say; but it is interesting to note that such as it is, it is virtually the most elevated tree line in the world. §

* Humboldt, "Views of Nature," p. 318. I met with this plant (summer of 1891) in various parts of Greenland, between lat. 69° and 77° 40′, growing from the sea-level to an elevation of 1500-2000 feet.

† Grisebach, *op. cit.*, i, p. 167.

‡ Crossed just before reaching the ranch of Tlamacas.

§ This statement, perhaps, requires modification. Pöppig, from manuscript data submitted to him by Engineer Benjamin Scott, asserts ("Reise in Chile, Peru und auf dem Amazonenstrome," ii, p. 80) that on the Peruvian Andes, near the hamlets of Huaylillas de Potosi and Uchusuma, treelets of (?) *Polylepis racemosa* are found at elevations of 15,883

In the north temperate regions the timber line, where marked by the disappearance of conifers at all, seems to characterize indiscriminately the zone either of pines or firs (spruces); probably in the greater number of instances the latter are the most far-reaching trees. In the Harz mountains, the Riesengebirge, the Böhmerwald, the Jura mountains, and in many parts of the Alps, Carpathians and Pyrenees the firs are the delimiting zone of forest; but again, in other parts of the Alps and Pyrenees, in the Tátra (Central Carpathians), the Altai, and on many of the mountain crests of the Mediterranean region, the pines (notably *Pinus cembra*) considerably overtop the firs, even if they do not form that distinct vegetal zone which is constituted by the latter. In North America, perhaps even more than in Eurasia, do the firs constitute the uppermost coniferal zone, a zone which is so eminently defined on the higher elevations of the Appalachian system of mountains (White mountains, Black mountains of North Carolina). In the Rocky mountains the pines and firs both attain the timber line, but the latter predominate by far as a zone-making element; indeed, on many of the more elevated summits the pines only sporadically mingle in with firs. It is the more interesting, therefore, to find that on the still higher summits of Mexico the reverse order obtains. The zone of firs (consisting of *Abies religiosa*), as I had occasion to observe on Orizaba, Popocatepetl, Ixtaccihuatl and the Nevado de Toluca, virtually ceases at about 11,500–12,000 feet,* or two thousand

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and 15,915 feet, or nearly 150 feet higher than the *Saxifraga Boussingaulti*, from the slopes of Chimborazo, which Humboldt considered to be "the highest growing phanerogamic plant in the world" ("Views of Nature," p. 234). Again, Humboldt himself observed occasional specimens of tree-like Verbesina on Pichincha at an elevation of nearly 14,400 feet ("Kleinere Schriften," p. 57). It seems likely that the measurements of altitude in both of these cases are given too high a value; at any rate, the more recent surveys of the Andean summits have, in nearly all cases, tended to diminish rather than to increase the formerly accepted measurements. Raimondy reports *Sambucus Peruviana* and *Polylepis racemosa* from an elevation of 14,390 feet on the Peruvian Andes; *Polylepis tomentella* was observed by Weddell at 14,710 feet, and *P. lanuginosa*, by Jameson, on Chimborazo, at 13,965 feet. Most of these upper trees are dwarfed, scarcely attaining more than a few feet in height, and, indeed, the actual timber line falls considerably below the elevations here given. Humboldt makes the interesting observation that in the region about Quito trees 45–60 feet in height are rarely met with above some 8800 feet. At Chicla, on the Peruvian Andes (13° degrees south of the Equator), at an elevation of 12,200 feet, Ball observed but a single tree, *Sambucus Peruviana*, a form closely related to the common black elder of Europe ("Notes of a Naturalist in South America," p. 101, 1887). In remarkable contrast to these cases of special elevation is the condition of the forest vegetation on Kilima 'Njaro, on approximately the third degree of south latitude. According to Dr. Hans Meyer, the "average limit of the forest belt is about 9600, the extreme limit imposed by the climatic conditions being some six or seven hundred feet higher" ("Across East African Glaciers," p. 132, 1891); phanerogamic plants are, however, found on the same mountain up to 15,420 feet (*op cit.*, p. 167). In the Sunda islands (Java, Sumatra, Borneo), which lie almost under the Equator, as is well known, the timber line also falls below 10,000 feet, although individual mountain summits rise 2000 and 3500 feet higher.

* We met with the last spruces on Ixtaccihuatl at approximately 11,500 feet; the lowest were found at about 9200 feet, or very nearly 1000 feet lower than we observed them on the peak of Orizaba. I have no doubt that the species in question is found at

feet below the line of the pines, and yet more below that of the last junipers.*

We observed the last specimens of this genus (*Juniperus tetragona*) covering the bare rocks of Orizaba at some little distance beyond the actual tree line. It is not always easy to determine just what are the causes which operate towards establishing and regulating the succession of special vegetal zones on mountain slopes any more than it is possible, in our present knowledge, to explain the anomalies of succession on the horizontal plain stretching towards the Pole. The law of parallelism in horizontal and vertical succession, which Humboldt first formulated, and which was founded on the perception of climatic influences almost alone, while it touches the broader aspects of the problem, does not essentially explain the detail; nor can it be said that the modification of this law, defined by an excess or decrease of solar illumination, the horizontality or verticality of the solar rays, etc. (as elaborated by Wahlenberg, Grisebach and others), any more explains the special contradictory features of this distribution. Preoccupation or first possession of a region by a special group of plants has doubtless much to do with the problem; it is an important factor towards determining supremacy, and must, therefore, largely regulate the outcome from a competitive struggle for existence.

The oaks of the Mexican volcanoes occupy the lower pine belt, ranging to about 10,000 feet. We obtained three species on Orizaba—*Quercus reticulata*, *Q. Orizabæ*, and a third form which we have not yet been able to identify. Above 8000 feet they are comparatively rare and no longer form forests, such as are to be met with in the lower region of 4000–6000 feet. In the more or less open dustcountry below the pines—*i. e.*, below where the pines appear on the western slope of Orizaba, about 9000 feet—they are still fairly abundant, forming groves and copses, but once entering the pines they appear only as stragglers. The same condition prevails on Popocatepetl and Ixtaccihuatl. Associated with the oaks are one or more species of alder, *Alnus Jorullensis* and *A. castanifolia;* we found the former a tree of some 15–20 feet height, extending up to 12,000 feet or more. The second form, which is now generally looked upon only as a variety of *A. Jorullensis*, and which we found on Popocatepetl at an elevation of about 11,000 feet, is a member of the flora of the Peruvian Andes—one of the very few plants which are common to the two regions.

As regards the non-arboreal vegetation of the Mexican summits, the list of species given at the beginning of this paper sufficiently illustrates

a very much lower altitude than where we actually observed it; indeed, it appears that Humboldt and Boupland met with it not far from the forest of Chilpanzingo, south of the Mexican plateau, at an elevation of barely more than 4000 feet.

* It is true that Schiede mentions the tree as rising to the timber line on Orizaba (Parlatore, in De Candolle's "Prodromus"), but I believe the statement to be erroneous. Galeotti's observations, which accord almost exactly with my own, place its limit at some 12,200 feet. Hemsley, on the other hand, reduces the elevation to 10,500 feet, a figure which is 1500 feet too low.

its character. A few remarks from personal observation may not, however, be amiss. We found the most varied flora—*i. e.*, in the region above 8000 feet—on Popocatepetl, and it was here, too, that the vegetation presented itself in its most luxuriant aspect.* Taking the physiognomy of the four summits into one general consideration, it may be said that the most noticeable or distinctive plants are two or more species of Senecio and a lupine (*Lupinus vaginatus*). The yellow flowers of the former and the blue of the latter were an ornament to the vegetation almost everywhere between 10,000 and 12,000 or 13,000 feet. *Senecio chrysactis*, a graceful plant 3–4 feet in height, reaches the limit of pines on all four of the loftiest summits, rising somewhat higher, seemingly, than *S. Galeottii*.

These yellow "asters," with the tall lupine, form a compact undergrowth to the upland pines, especially where the latter have been in one way or another thinned into groves, leaving patches of open country in their midst. In such localities the vegetation is truly luxuriant, and the eye is charmed by the brilliancy of color which is everywhere manifest. The horseman traverses a flowering prairie with his animal buried to its flanks in the rank growth ; on Popocatepetl, more particularly, is this the case. Above 13,000 feet we found the greatest number of species in flower on Ixtaccihuatl. Here, immediately about our night's camping ground, at an elevation of approximately 13,200 feet, we found a veritable garden. The ground was decked with a profusion of the blood-red *Castilleja Tolucensis*, the carmine *Echeverria gibbiflora* (or *E. secunda?*) and the yellow *Ageratum arbutifolium*, while from the rock-fissures protruded tufts of *Asplenium trichomanes* (var. *majus*)—the only fern we were fortunate enough to secure for our collections—and partially concealed masses of *Chionolæna lavandula*, *Phacelia pimpinelloides*, etc. The moisture which here accumulates from the melting snows combines with a favorable position and exposure to sunlight towards a specially luxuriant growth. At the base of the boulder mass which marks the last stage in the ascent of the Nevado de Toluca—consequently at an altitude of 14,200 feet—we found the ground similarly carpeted with flowers, noticeably so with clumps of *Castilleja Tolucensis*, but at this elevation the general aspect of the region was far less cheerful and inviting than on Ixtaccihuatl. There was little or no grass or moss, and the Castillejas and Echeverrias merely occupied sand spots between the lichen-covered rock débris. The last flowers to disappear on Orizaba, so far as our own observations extended, were the *Castilleja*, already mentioned, and a *Draba* (*D. aretoides* or *D. Popocatepetlensis*), both of which follow close to the snow line, or very nearly to 15,000 feet—possibly even above this point. The last-named plant was also found on Popocatepetl and Ixtaccihuatl, but at a somewhat lower level (13,000–13,200 feet).

* I have no doubt that the eastern face of Orizaba—the side from which Liebmann and Galeotti made their ascents—is much more prolific in plant life than the one turned towards the dry and dusty table-land (the side of San Andres Chalchicomula), whence our party scaled the summit.

Among the more distinctive vegetal features of the lower volcanic slopes may be cited the dense bushes or thickets of *Arbutus spinulosa* and (the rigid) *Symphoricarpus microphyllus*, which border the rough mule-ways for long distances at (approximately) the 11,000 foot level, characterizing there a partial zone of their own. We found the ericaceous plants particularly abundant on Popocatepetl. With them is associated the magnificent red-flowering honeysuckle (*Lonicera filosa*), a stately plant 4–6 feet in height, which is certainly one of the most attractive growths of the region. To this zone succeeds a belt of composites, characterized by a special development of *Baccharis concava* and *Erigeron maximus*. It need hardly be said that the zonal lines—if, indeed, they are really worthy of such characterization—are not well differentiated; the plants of different belts mix in well with one another, so that everywhere there is considerable overlap. Nor do the same plants always occupy the same positions on the different mountains. Still, an approximation to zonal separation is to an extent manifest, especially where the maximal development of any series of plants is reached.

One of the most beautiful plants of the roadside, most abundant, perhaps, between 11,000 and 12,000 feet, is a pink evening primrose (probably *Œnothera tetraptera*) with flowers somewhat smaller than those of a rose; the plant can, indeed, be appropriately designated the "alpine rose" of the Mexican mountains, as it is not unlike in general appearance a wild rose, though provided with only four petals. Its showy blossoms constitute one of the glories of the mountain roadways, but it is not entirely absent from favored open spots of the lower regions. We met with the plant abundantly in the meadows about Patzcuaro, at an elevation barely exceeding 7000 feet. Here it was associated with *Jussieua repens*, *Cuphea procumbens*, *Sisyrinchium micranthum* (?), *Baccharis conferta*, etc.

The preponderating element in the upper Mexican flora is made up of forms which distinctly represent the temperate and Arctic regions, and not of modifications (suited to a more rigorous climate) of the lower or basal floras of the same region. This is the condition which is found to characterize the high mountain floras of tropical regions generally, as distinguished from those of temperate climes, and for reasons which have been well pointed out by Engler in his exhaustive treatment on the development of the vegetable world.* Most of the Mexican plants occurring above 10,000 feet, while they are to a very great extent congeneric with the forms of temperate North America, are specifically almost wholly distinct. Indeed, the relationship with the plants of the much more distant Andean summits, so far as the recurrence of identical specific forms is concerned, appears to be considerably more intimate than it is with the forms belonging to the north. The reason for this is to me at the present time entirely conjectural.

* "Versuch einer Entwickelungsgeschichte der Pflanzenwelt," ii, 1882.

The following species are found on the Andean summits from New Grenada to Peru or Bolivia:

Ranunculus Peruvianus.
Sisymbrium canescens.
Cerastium Andinum.
Arenaria alsinoides.
Colobanthus Quitensis.
Trifolium amabile.
Alchemilla orbiculata.
" Sibbaldiæfolia.
" tripartita.
" hirsuta.
Acæna elongata.
Ottoa œnanthoides.
Tauschia nudicaulis.
Lobelia nana.
Halenia elata.
Saracha umbellata.
Mimulus glabratus.
Veronica serpyllifolia.
Alnus acuminata.
" Jorullensis.
Sisyrinchium scabrum.

—about ten per cent. of the entire flora. In view of the distance which separates the two regions—some 900 to 2400 miles—this is, after all, not such a small number; indeed, the wonder is rather that so many alpine forms should have found it possible, in the region of the tropics, to cross the depression of the Isthmus of Panama.

Observations on the Chinantec Language of Mexico.

By Daniel G. Brinton, M.D.

(*Read before the American Philosophical Society, January 15, 1892.*)

Name.—The folk-name *Chinanteca*, plural of *chinantecatl*, is a word in the Nahuatl language meaning, "inhabitants of Chinantla," which latter signifies a spot enclosed by cane hedges or palisades. By extension, the common term for "village" was *chinamitl*, as they were usually protected by such light defenses. The Chinantecs, therefore, as a nation, are known to us only by the name applied by their neighbors, the Aztecs, to their chief town.

The assertion of Orozco y Berra that they were also called *Tenez* arose from a misunderstanding of the letter of Hernando de Barrientos to Hernando Cortes (1521). Barrientos was not among the Chinantecs proper, but in another *chinamitl* in Chiapas.* Still other *Chinanteca* are mentioned as resident in Nicaragua. This Nahuatl word has absolutely no ethnographic significance.

Several authors have confounded these Chinanteca with the "Tzinacanteca," or Bat-people, a Maya tribe in Tabasco and Chiapas. The two are nowise related.

Location.—Their country was located in the mountains of the eastern portion of the State of Oaxaca and on the frontiers of the present State of Vera Cruz. Their neighbors on the north and east were Nahuatl-speaking tribes, on the south the Zapotecs and Mistecs, and on the west the Mazatecs and Cuicatecs, the latter supposed to be a distant branch of the Zapotec stock. Within these boundaries was a wide variety of climate, ranging from the torrid vales of the *tierra caliente* up to the chilly regions of the high sierra, where we find one of their villages with the significant name "Holy Mary amid the Snows," Santa Maria de las Nieves. The village of Chinantla itself is situated in a wild and mountainous district where the climate is cool and rainy.† Orozco y Berra gives the names of thirty-four other towns inhabited by them.

History.—The Chinantecs are an extremely ancient people who have resided on the spot where the Spaniards found them from the earliest period of the traditional history of Mexico. We first hear of them as having been conquered by Ahuitzotzin, ruler of Mexico. This event according to the chronology of Torquemada, who is our authority for it,‡ took place in the year 1488.

They were treated by their conquerors with the utmost severity and cruelty, of which the historian Herrera cites several instances.§ They were glad, therefore, on the appearance of the Spaniards to throw off the yoke of the Mexicans and lend their aid to the invading strangers.

Culture.—The Chinantecs are described as a rude savage people, living in huts constructed of branches of trees, and devoid of the culture of their neighbors on either hand, the Zapotecs or the

* See the letter of Barrientos in the *Cartas y Relaciones de Hernando Cortes.* Edition of Don Pedro de Gayangos, Paris, 1866, pp. 204, 205 and notes.

† E. Mühlenpfordt, *Mexiko*, Bd. ii, s. 214.

‡ Juan de Torquemada, *Monarquia Indiana*, Lib. ii, cap. lxiii.

§ *Historia de las Indias*, Dec. iii, Lib. iii, cap. xv.

Nahuas. Their principal weapon is said to have been lances of unusual length which they handled with singular dexterity.

Literature.—The first to reduce the Chinantec language to writing was Brother Francisco Saravia. He was a native of Seville, in Spain; by trade a cabinetmaker, in that capacity he emigrated to the City of Mexico, where he married and carried on a prosperous business. The death of his wife, when he was about thirty-five years of age, led him to renounce the world, and in 1574 he joined the order of Dominicans. Having been assigned to the province of Oaxaca, he devoted himself to studying the language of the Chinantecs, and in collecting them from the caves and ravines in which they lived into villages where they could cultivate the soil. His success was great, and the natives regarded him with equal love and reverence. For fifty years of his long life he labored among them, and when he died in 1630, at the ripe age of a nonagenarian, he left in the archives of his order a number of MSS. in and upon the language. Of these we have the titles of a *Catecismo*, an *Arte*, a *Confesionario* and *Sermones*. Probably the most important was his *Gran Homilario Chinanteco*, a copy of which he placed in every one of the parishes under his care, so that the native sacristan could read the homily when the priest should be prevented from attending. More interesting to the historian doubtless was his autobiographical sketch of the tribe written under the title *Noticia de la Conversion de la Nacion Chinanteca y sucesos acaecidos en ella al Autor.*

I do not know of a single copy of any of Saravia's writings; and what is more remarkable, Father Nicholas de la Barreda, who precisely one hundred years after Saravia's death printed in Mexico the only known book in the language, had never even heard of his predecessor's labors, and states specifically in his Prologue that he had not found so much as a word written or printed in this tongue.

Barreda himself is said to have been a native of Oaxaca, and began his missionary work among the Chinantecs about 1708. For a score of years he had been cura of San Pedro de Yolos, when his book appeared—*Doctrina Christiana en Lengua Chinanteca* (4to, Mexico, 1730). Of this only two copies are known to be extant, from one of which I possess a careful MS. copy by the hand of the late Dr. C. Hermann Berendt. This learned Americanist had commenced a study of the tongue, and left a few notes

upon it, which have also been of some service to me, although they are quite fragmentary.

The tongue is not included in Pimentel's *Cuadro Descriptivo de las Lenguas Indigenas de Mexico*, and there is no specimen of it accessible to students of linguistics. It appears, therefore, worth while to present a short description of its character; the more so as this seems different from many American tongues on account of the singular simplicity of its construction. In fact, I entertain some doubts whether Barreda's version represents correctly the idiom in its pure form. It certainly reveals no such difficulties as he speaks of, and resembles strongly a jargon in which inflections and syntactic relations have been reduced to their lowest terms. Several of the translations of the early missionaries have proved, on examination, to be in a jargon or trade language of a tribe, and not in its real speech. This may be the case here.

The Language.—The Chinantec tongue appears to have no affinity with any of its neighbors. It is described as guttural, rough in enunciation and difficult to learn. Barreda says in his Prologue that many of the priests assigned to parishes in the nation tried in vain to acquire it, and, failing in this, attempted to introduce the Nahuatl among the Chinantecs; and that this proving a failure, had asked for other fields of labor. He himself, after twenty years of study, had succeeded but moderately in mastering it, but adds that he had exercised the utmost care in translating the *Doctrina*, submitting every word in it to the most intelligent natives of his parish. The dialect he employed was that of Yolos, which differed, but not greatly, from that of other portions of the nation.

The pronouns are but slightly developed—a fact in marked contrast to most American tongues. The same form serves for both the personal and the possessive pronouns, and it is probable that there is no distinction between their singular and plural number, although a slight difference is sometimes indicated.

PRONOMINAL FORMS—PERSONAL AND POSSESSIVE.

I,	*na.*	We,	*nah.*
Thou,	*no.*	You,	*no.*
He,	*quia.*	They,	*quiaha.*

It is noteworthy that the pronoun of the third person, *quia*, may be used for either the second or the first in its possessive sense; thus,

vi chaaqui quia, "for his sins," instead of *vi chaaqui na*, as a translation of "for my sins." So again, *animas quia*, as a translation of "our souls." This is analogous to the language of children, who do not clearly distinguish persons, and often refer to themselves in forms of the third person instead of the first.

The interrogative is *he*, which also serves as a relative, and with the addition of the adverb of place, *la*, here, forms the demonstrative, *hela*, this, as *hela cna in*, "this first one." The demonstrative "that" is usually given by *da* or *nda*.

The indefinite pronoun *cha*, some, some one, somebody, is frequently prefixed, often apparently in a collective or distinctive sense, as *chañuh*, "some man" or men, *i. e.*, people in general; *charuhno*, "thy neighbor;" *chazaquiun*, "somebody bad"—the devil; *chajhian*, "somebody else."

In all cases the possessive pronouns are suffixed to the nouns.

The verbal forms appear to vary considerably. A terminal *e* or *a* appears to mark the infinitive, as *pane*, to chastise; *ngueihna*, to kill. The imperative is characterized by the pronoun, as

Phua ha cala phua na.
Say thou as say I.

The reflexive has the pronoun before and after the verb:

Na juanih na.
Me bow I.
(I bow myself.)

The interrogative form is thus:

Cale cuihno ñuh quiaha?
Didst know thou man her?
(Didst thou know her husband?)

Ca-cuim-ba-na.
I did know him.

In these sentences *ca* is the sign of the preterit, as again in the following sentence:

Ma ca-mea testamento ñuh u?
Did thy father make a will?

Where the present form of the verb is *mea*, to make.

Prepositions.

The prepositions are properly such, being prefixed to the nouns, and separated from them.

In, *no;* as, *no toho,* "in the belly;" *no caliz,* "in the calix" (sacred cup); *no chaaqui,* "in sin."

On, *ni;* as, *ni altar,* "on the altar;" *ni muicui la,* "on this world."

Into, *lei;* as *hiñi lei gotan tan vino lei muian,* "(the) bread into flesh and (the) wine into blood."

Before, in the presence of, *quiani;* as *quiani jhian quecha,* "before other persons." Before, in time, *gean.*

After, in time, *quéin.*

Conjunctions.

And, *tan.*

Also, *jalabajna;* as, *jalabajna na ñina,* "also I am poor."

Numerals.

	Cardinals.	*Ordinals.*
1	*cna,*	*hela cna in.*
2	*tno,*	*hela tno in.*
3	*nne, nei,*	*hela nne in.*
4	*quiu,*	*hela quiu in.*
5	*ña,*	*hela ña in.*
6	*ñiu,*	*hela ñiu in.*
7	*nyaa,*	*hela nyaa in.*
8	*ñna,*	*hela ñna in.*
9	*ñu,*	*hela ñu in.*
10	*nya,*	*hela nya in.*
20	*nyanya.*	
40	*tno laa.*	
50	*tno laa nya.*	
60	*nne la.*	
70	*nne la nya.*	
80	*quiu la.*	
100	*ña la.*	
200	*nya la.*	

Texts.

The Lord's Prayer.

Phui ñuhu nah ñujui quinno, qualin cuiá hela xi-no; quæhe
Lord father our heaven it in, may blessed that name-thy; come
nah ñujui quiehe; quali heli hahà muycuila, jalabajna ñujui; quæhe
us heaven thy; may that will earth on, also heaven; give
hi nah chaháchahá, tan ih-no chaaqui quiee nah, can jhiala in nah
bread us all the time, and wilt-thou sins forgive us, just as we

chazaquiun quiani nah ; tan za ton-no nah qûchi vi chaaqui ; qui mi nah
sins pardon against us ; and not thou us bring to sin ; take us
phui Dios geila he zaquiu.
Lord God all this evil from.

Extract from the Doctrina of Barreda.

Porque se hizo hombre el hijo de Dios ?

He vi caleñuhne Jna Dios ?

Por librarnos de los manos del Demonio, y por redimir nos del pecado.

Vi caquinne nah quaacha lin, tan vi caquinne nah ni chaa qui.

Que hizo Nuestro Señor Jesu-Christo para librarnos ?

He camea phui nah Jesu Christo, vi caquinne nah ?

Padeció muchos tormentos, fué crucificado, murió y fué sepultado.

Cangûinne ñule Juahui, cajanqua ni cruce, cajone, can cahanne.

Que hizo nuestro Señor Jesu-Christo despues que murió ?

He camea phuinah Jesu Christo, qua male jonne ?

Al tercero dia despues que murió, rescuscitó, y á las quarenta dias despues que resuscitó subió á los cielos y se sentó á la mano diestra de Dios padre todo poderoso.

Nne mui qua male jonne, cagnihi, tan tno la mui qua male cagnihi cangaa na ñujui, tan cahuiaà quaa cha Dios mii geilaha li mea.

Vendrá otra vez nuestro Señor Jesu-Christo á este mundo ?

Nijhea que tno phui nah Jesu Christo, mui cuila ?

Otra vez hà de venir quando se acabe el mundo, á tomar cuenta á todos los vivos y muertos para darles el cielo para siempre á todos los que guardaron bien sus mandamientos; y á los que no los guardaron bien, les dará para siempre penas en el infierno.

Cna que, nijhea mui cha in mui cui, jhea quià quenta geilan cha xan, tan cha jon, cha queh ñujui geila muiba geilan cha ca hah quiu mandamiento quiaha ; tan hi chaza cahah quiu, queh geila muiba juahui nya jui.

Como murió nuestro Señor Jesu Christo ?

Ihiala cajonne phui nah Jesu Christo ?

Murió como hombre ; no murió como Dios; porque Dios no puede morir.

Cajonne calan cha, aza cajonne calan Dios, chavi Dios aza li jonne.

Si Dios no puede morir, como murió nuestro Señor Jesu Christo ?

Ze Dios aza li jonne, ihiala ca jonne phui nah Jesu Christo ?

Aunque nuestro Señor Jesu Christo era Dios, era tambien hombre, y asi pudó morir como hombre, y no pudó como Dios ; porque Dios nunca puede morir.

Gni cu jua phui nah Jesu Christo yha Dios, ja hala jna yba ñuhne; vihe jna le jonne calan chañu, tan aza li jonne calan Dios ; chavi Dios aza li jonne jua lei que.

Quando muere la gente en este mundo, tambien mueron sus almas?

No mueron sus almas, sinó solamente el cuerpo muere; porque no puede morir el alma.

Y cuando muere el cuerpo, muere para siempre?

No puede morir para siempre, porque el dia que se acabe el mundo, resuscitaran todos los cuerpos, y se juntaron con sus almas, ya para nunca mas morir.

Adonde van las animas de los defuntos quando mueren sus cuerpos?

Las animas de los buenos van al cielo para siempre, porque guardaron bien lo que manda la ley de Dios; y las almas de los malos van al infierno, porque no guardaron bien lo que manda la ley de Dios.

* * * * *

Que es cielo?

Cielo es un lugar lleno de mucho y grande gloria; lleno de todo genero de bienes, y de todo genero de alegria, en donde está Dios nuestro Señor, la Santissima Virgen, todos los Angeles y todos los Santos. Allí van las almas de los buenos que sirvieron à Dios à descansar para siempre, que nunca se podrá acabar.

Ma jonnencha muicuila, jabala jna jon anima quiaha?

Aza jon anima quiaha, ma jna la ha gotamba jonne; vi aza li jon anima.

Tan ma jonne gotan, jonne cnaphue?

Aza li jonne cnaphue geila muiba, vi quiaha mui cha in muicui, jna tno nigni cala geila gotan, tan nigni cnaha animas quiaha, vi aza jua cna li jonne.

Jhia cha animas cha jon ma jonne gotan quiaha?

Animas chaqui vn cha ñu jui geila muiba, chavi hah quiu he quiu hu tà ju quiaha Dios; tan animas cha zaquiun cha nya jui, chavi za hah quiu he quiu hutà ju quiaha Dios.

He ñu jui?

Nujui cna namba, canlè ñu phueli gloria, canlè cala geila juayanchij, thia nhuiaa phui nah Dios, xa ñujui, geilan angeles, tan geilan santos. Nda cha animas chaquiun, cha camea ta quiaha Dios, ma hine cala geila muiba, aza jua li chan.

English-Chinantec Vocabulary.

Alive, *chazan.*

All, *geila, geilan, lagei; geila hejna,* "all these things;" *geila balimea,* "all-powerful."

And, conj., *tan.*

Bad, *azaquiu, zaquiu, chaaquiu* (= not good).

Because, *chavi.*

Believe, to, *changa.*

Belly, *toho;* "in the belly of the virgin," *ño toho za muinne.*

Bird, *ta.*

Blood, *muian, muien;* "by the blood," *muien no* (*mui* = water and woman).

Body, *gotan;* "in body and soul," *gotan tan anima quiaha.*

Boy, *quana.*

Bread, *hiñi.*
Breast, *chij.*
Brother, *run.*
Child, *yun.*
Day, *muiba.*
Dead, *ma-jon, cha-jon.*
Devil, *zaquiun* (see "bad"); *chalin* (see "sick").
Die, to, *jon-ne.*
Drink, to, *nguhu.*
Ear, (*la*)*quaha.*
Earth, *muycui.*
Eat, to, *cuhu.*
Eye, *manihi.*
False, a lie, *azacha* (= not true).
Father, *ñuh* (= man); *mii; Dios mii,* "God the Father."
Fire, *gêi.*
Foot, *tehi.*
Full, *canlé.*
Girl, *mui yun* (= female child).
Give, to, *quæ, quæ he.*
Good, *quiu.*
Grandfather, *nyuh.*
Grandmother, *nyaa.*
Great, *phue;* superlative, *ñu phueli.*
Hand, *quaha;* "open thy hands," *janquaha!* "In thy hands I place my soul," *nquaha na animaquia.*
Head, *gui;* "throw water on the head of the child," *yaha mui ni gui yun.*
Heart, *haha.*
Heaven, *ñuju, nahui.*
Hell, *nyajui.*
Herb, *ha.*
House, *nu.*
How, *jhiala, cala;* how long, *ja mui.*
Husband, *ñuquia* (= consecrated man, *i. e.*, by the Church).
If, *ze.*
Infant, *chimina.*
Join, to, *cun* (= to marry).
Know, to (saber), *ñih.*
Know, to (conocer), *cuih.*
Kill, to, *ngueihna.*
Live, to, *xan.*
Magician, *gin.*
Make, to (Span. hacer), *mea.*
Man, *ñuh. cha-nu*
Meat, flesh, *gno.*
Money, *cu.*
Month, *zei.*
Moon, *zei.*
Mother, *xa, xaha.*
Mountain, hill, *maa.*
Much, *ñu, ñule.*
Name, *xi; hi xi no?* "What (is) thy name?"
Nephew, niece, *nyaa.*
No, *aza, za.*
Nothing, *aza-he.*
Now, *na.*
Or, *qua.*
Pay, to, *qui-hi, quei.*
Place, *namba.*
Poor, *ñin, ñina.*
Pudenda feminæ, *yuh.*
Pudenda viri, *cnu.*
Relation, a, *ruh, run* (= brother).
Shoulder, *cà.*
Sick, *chah.*
Sin, *chaaqui.*
Small, little, *miha.*
Son, *jna.*
Soon, *naba.*
Speak, to, *phua.*
Steal, to, *êehi.*
Stick, wood, *ma.*
Stone, *cnu.*
Sun, *mañui.*
Tears, *mui nii* (= water, eyes).
Town, *jui.*
True, *cha.*
Uncle, aunt, *heaya.*
Virgin, *muinne* (v. woman).
Water, *mui.*
When, *ma.*
Where, *jhia.*
Wife, *muiquia* (see "husband").

With, *cnaha.*
Wizard, *lan.*
Woman, *mui, cha-mui.*
Word, *ju; cna ju,* "one word"
Work, to, *ta.*
Year, *gni.*
Yes, *za, jna, ma* (*iba* = it is).

On the Mazatec Language of Mexico and its Affinities.

By Daniel G. Brinton, M.D.

(*Read before the American Philosophical Society, January 15, 1892.*)

In the northeastern corner of the State of Oaxaca lies a mountainous tract, watered by numerous streams, known from earliest times by its Aztec name *Teutitlan*, the Divine Land, or The Land of the Gods, and officially now as the district Teutitlan del Camino. It has about 26,000 inhabitants, a large proportion of whom are of native blood. These speak three radically different languages—the Cuicatec, which is probably a dialect of the Zapotecan stock; the Chinantec, which stands alone, and the Mazatec, of which nothing whatever has been known, and which it is my aim to examine and, if possible, classify in the present study.

The material I have for the purpose is an unpublished vocabulary, collected by a Danish officer, who was in the service of Maximilian, and which has been obligingly furnished me by Mr. Alphonse Pinart, whose extensive researches in American linguistics are well known. The only published materials in existence are two translations of the Lord's Prayer into different dialects of the tongue. These have been reprinted by Pimentel, Bancroft and other writers. Their precise provenance is unknown; as for the vocabulary, it was obtained at Huantla, northeast of the town of Teutitlan.

Names.—The name Mazatecatl—plural, Mazateca—means "Deer People" in the Aztec or Nahuatl language. It may have been given them by their Nahuatl neighbors on account of their land abounding in deer; or, as some say, because they worshiped the figure of a deer—that is, had a deer totem among them. There were other Mazatecas living in the present State of Tabasco, and yet others in the State of Guerrero; but we have no reason to suppose that those "Deer Peoples" were at all related to these in Teutitlan. What they called themselves, if they had a collective tribal name, we do not know.

Nor is it certain why their country was referred to by the Aztecs as "The Land of the Gods." It seems likely that it was on account of the numerous temples that existed there, and the unusually devotional character of the natives. The remains of these ancient religious structures and of the artificial mounds which supported them still bear witness to this, and two of their villages yet bear the names San Antonio de los Cues and San Juan de los Cues, the term *cues* (a Haytian word) being applied by the Spaniards to artificial mounds. The former is situated in the valley of the Rio Salado; the latter in an adjacent valley. Unfortunately, no archæological exploration of them has been reported.*

Their religious character is also referred to by the early Spanish writers. Sahagun describes them as performing remarkable tricks at certain festivals, such as swallowing live snakes and frogs.† Mendieta speaks of their rigid fasts and abstinence from marital relations for fifteen days after the nuptials. The historian Herrera gives the following description of some of their rites:

"In the Province of Teutitlan, where the Mazatec language is spoken, which adjoined that of the Mistecs, they were accustomed to flay the sacrificial victims, and carried the skins to the neighboring villages, asking alms. On the day of a certain important festival, which took place annually, the priests ascended the temple and struck a war drum. At this signal all the Indians who were in the fields had to run to their houses and their town. Then those who had carried the skins of the victims sallied forth and ran about the country till midday, and whenever they caught a person they cut his hair so as to form a sort of crown around his head, and such persons were destined to be sacrificed within one year." ‡

According to Aztec mythology—which is very rarely to be regarded as historical—the natives of Teutitlan were descended from Xelhua, the oldest of the six sons of Iztac Mixcohuatl and his wife, Ilancuey, the venerable pair who dwelt in and ruled the mysterious northern Land of the Seven Caves, called in Nahuatl Chicomoztoc.§

* Another Teotitlan—"Teotitlan del Valle"—is found in Oaxaca. It was so called from the temple of a famous divinity, which was erected on the summit of a high rock near by. This was the goal of numerous pilgrims, and, according to Señor J. B. Carriedo, "fué uno de los santuarios de mas estima y de mas nombre en la gentilidad." *Estudios Historicos del Estado Oaxaqueño.* Tom. i, pp. 15, 16.

† *Historia de Nueva España.* Lib. ii, Apendice.

‡ *Historia de las Indias Occidentales*, Dec. iii, Lib. iii, cap. 15.

§ Mendieta, *Historia Eclesiastica Indiana*, Lib. ii, cap. 33.

This Xelhua was a mighty man—one of the "Giants,"—and was surnamed the Builder, for he it was who constructed the famous Pyramid of Cholula. He is also referred to as chief of the Olmeca, an unknown, ancient people.

We need attach little importance to these old stories, and will find it more profitable to turn to the language of the Mazatecas to discover their affiliations.

In investigating its possible analogies with other idioms, I have been somewhat surprised at the relationships which it certainly discloses. These are not with the Zapotec-Mixtec stock, as I have (erroneously) stated in my work, *The American Race*,* but with two quite remote and independent stocks.

The one of these is the Chapanec, which was spoken in the present State of Chiapas, and also at the time of the conquest by many thousand natives, who occupied the shores of Lake Managua and Fonseca Bay, in Nicaragua, where they were known as Mangues and Orotinans. The dialects of this stock are closely akin to each other.

The second list of affinities point to a still more remote and unexpected relationship. The Mangues had as neighbors beyond the Cordilleras, in Costa Rica, a group of related tribes—the Talamancas, Borucas, Bribris, Vizeitas, etc., whom I shall call, collectively, "Costa Rican." These have been satisfactorily shown by Dr. Max Uhle, Dr. A. Ernst and other students to be not distantly connected with the important Chibcha stem of New Granada, which, at the conquest, was widely extended over that Province, and is the only linguistic stock of South America whose presence in North America has been proved.†

After presenting the vocabulary furnished me by Mr. Pinart and the texts offered by Pimentel I shall pursue the comparisons of the stock of terms thus supplied.

English-Mazatecan Vocabulary.

Arm, *chale.*
Bad, *minda.*
Banana, *nacha'.*
Beans, *nahma'.*
Beard, *tza' á.*
Black, *twna.*
Blue, *iso.*
Boy, *indidi* (see "Son").
Bread, *chu hi.*
Breast (chest), *animale.*

* *The American Race: A Linguistic Classification and Ethnographic Description of the Native Tribes of North and South America*, p. 142 (New York, 1891).

† See *The American Race*, pp. 184-186.

PROC. AMER. PHILOS. SOC. XXX. 137. E. PRINTED MARCH 5, 1892.

Brown, *schene'*.
Cactus, *nan' da*.
Cat, a, *chito*.
Chief, *chicunai*.
Church, *inai*.
Clothing, *nikye*.
Clouds, *ifl*.
Cow, *ngchaha'*.
Daughter, *tzadi* (see "Girl").
Day, *gunichi*.
Dead, *coviu*.
Die, to, *cuiyane*.
Dog, *nanya*.
Door, *chutoa*.
Ear, *schical*.
Earth, *nangi*.
Egg, *cho'*.
Evening, *gischo*.
Eye, *schca*.
Eyebrows, *tza izpan* (?).
Father, *tata*.
Finger, *noon-tza* (see "Hand").
Fire, *nii*.
Foot, *tzócó*.
Forehead, *ten*.
Girl, *tzadi*.
God, *naina'*.
Gold, *naleto*.
Good, *dani*.
Green, *tzare'*.
Hail, *tzinayo*.
Hair, *coshe'*.
Hand, *tza*.
Hat, *tzingye*.
Head, *tku*.
Heaven, *gami*.
Here, *ihndi*.
Hill, *nindo*.
Iron, *quicha*.
Large, *tzea*.
Leaf, *schcatiya* (= ear-tree).
Light, *ase'*.
Lightning, *kuata*.
Lungs, *nyesi*.
Maize, *name'*.
Man, *chii*.
Meat, *yoje*.
Money, *to*.
Moon, *sa*.
Morning, *tanhya*.
Mouth, *tzoa*.
Night, *nhyu*.
Nose, *nitu*.
Onion, *tutzo*.
Palm, *schahe'*.
Paper, *schuhu'*.
Plantain, *nacha'*.
Plaza, *titzi*.
Pretty, *da*.
Rain, *tzi*.
Red, *ini*.
River, *dahoe*.
Road, *diya*.
Sea, *dachicu*.
Sheep, *chitzanga*.
Sierra, *gihya*.
Silver, *tonschua*.
Small, *tua*.
Snow, *dandya*.
Son, *indi* (see "Boy").
Star, *ningutzea*.
Stone, *noyo*.
Summit, the, *garonindo*.
Sun, *sui*.
Teeth, *niiyu*.
There, *hani*.
Thigh, *chamila*.
Toe, *noontzoco* (see "Foot").
Tree, *iya*.
Tobacco, *nahnu*.
To-day, *gandai*.
Tomato, *chiti*.
Town, *naschananda*.
Turkey buzzard, *nikye*.
Ugly, *chiu*.
Water, *nanda*.
White, *chuhua*.
Wind, *to*.
Woman, *chu*.
Year, *guno*.
Yellow, *sine*.
Yesterday, *gohia*.

The personal pronouns are:

I, *gāa'*.	We, *gahi*.
Thou, *gahye'*.	You, *gahini*.
He, *he*.	They, *niahne'*.

Of the possessives I find the following:

Mine, *na*.	His, *le'*.
Thine, *li*.	Our, *nahan*.

The numerals are given thus:

1	*go'*.	8	*hi*.
2	*ho'*.	9	*nyaha'*.
3	*ha'*.	10	*te*.
4	*nĭhu'*.	11	*tengo*.
5	*ŭ*.	15	*chu*.
6	*hŭ'*.	20	*cung*.
7	*yato'*.	30	*kate*.

There are two versions of the Lord's Prayer given in Pimentel's *Cuadro Descriptivo de las Lenguas de Mexico*. They evidently have been made by different persons, and represent different dialects of the tongue, and apparently neither is in that of Huantla, where the vocabulary was obtained. Both, however, are clearly Mazatec, and the differences disappear considerably on analysis.

They are as follows:

A.

"Nadmina naina ga tecni gahami; sandumi ili gatirrubanajin nanguili; cuaha catama janimali, jacunit dic nangui cunit gahami; niño rrajinna tey quitaha najin: qntedchatahanajin gadchidtonajin jacunitgajin nedchata alejin chidtaga tedtunajin: guquimittacuntuajin, tued tinajin cuacha catama."

B.

"Tata nahan, xi nacá nihaseno: chacua catoma ñiere: catichová rico manimajin: catoma cuazuare, donjara batoó cornangui, bateco nihasen: niotisla najin ri ganeihinixtin, tiuto najin dehi: ni canuhi ri guitenajin donjara batoo, juirin ni canojin ri quiteisajin: quiniquenahi najin ri danjin quisanda nongo niqueste Meé."

Referring to the first as A and the second as B we may make the following comparisons with words in the Vocabulary:

	A.	B.	Vocab.
Our,	*naina,*	*nahan,*	*nahan.*
Father,	*nadmina,*	*tata,*	*nami* ("cura").
Thou,	*ga,*	*nacá,*	*gahyé.*
Heaven,	*gahami,*	*nihaseno,*	*gami.*
Earth,	*nangui,*	*nangui,*	*nangi.*
Kingdom (thy),	*janima-li,*	*manima-jin.*	
Give (thou),	*niño,*	*nio-tisla.*	
To-day,		*ganei,*	*gandai.*
Us (= to us, of us),	*najin,*	*najin.*	

Turning now to an investigation of the affinities of the Mazatecan, I present the following arrangement of a number of words, with their corresponding terms, in dialects either of the Chapanecan or Chibchan stock. It is noteworthy that very rarely do we find any word which is at all alike in the three. The Mazatecan terms seem to have been derived from two sources radically dissimilar.

Comparison of the Mazatec with the Chapanecan and Chibchan Stocks.

			Chibchan.	
	Mazatec.	Chapanecan.	Costa Rican.	New Granadian.
Arm,	*chale,*	*goloa, ghulua.*		
Banana,	*nacha,*	*noko-tona.*		
Black,	*tuna,*		*turinat,*	*funza.*
Blue,	*iso,*		*dsāhe, siona.*	
Breast,	*animale,*		*aniermi, V.*	
Cat,	*chito,*	*tzitu.*		
Chief,	*chicunu,*			*chiquy* (priest).
Dead,	*coviu,*	*coijme.*		
Die, to,	*cui-yane,*	*hui.*		
Dog,	*nanya,*	*nombi.*		
Ear,	*schical,*		*sekuke, ikuaga,*	*quhyca.*
Eye,	*schcu,*		*ocua, s'ócvo,*	*upcua.*
Fire,	*nii,*	*nio.*		
Flesh,	*yoje,*	*nbohoui.*		
Foot,	*tzoco,*		*tzuku-nukue, V.*	
Good,	*dani,*	*pami, game.*		
Hair,	*coshé,*		*schá,*	*quyhé.*

			Chibchan.	
	Mazatec.	Chapanecan.	Costa Rican.	New Granadian.
Hand,	*tza,*			*yta.*
Head,	*tku,*	*θokua.*		
Here,	*iḥndi,*	*jande.*		
Hill,	*nindo,*	*ndĭli.*		
Hilltop,	*garomindo,*	*namando.*		
Lightning,	*kuata,*	*koita-pumene.* (thunder)		
Maize,	*nama,*	*name.*		
Man,	*chii,*		*hechiche.*	
Money,	*to,*	*tu-mi.*		
Moon,	*sa,*		*só, sie,*	*za* (night).
Mouth,	*tzoa,*	*duŭi.*		
Mountain,	*gihya,*	*gua.*		
Night,	*nhyu,*	*nyufui.*		
Nose,	*nitu,*	*nyungu.*		
Rain,	*tzi,*			*siu.*
Red,	*ini,*		*bets-ena, serir-ine.*	
River,	*dahoe,*	*nāju.*		
Road,	*diya,*	*nila.*		
Sea,	*dachicu,*		*deche, dechequ-in.*	
Small,	*tua,*		*tzoua-pa, T.*	
Star,	*ningutzea,*	*najuiti.*		
Stone,	*noyo,*	*nyugu, noca.*		
Sun,	*sui,*		*chui,*	*sua.*
Teeth,	*niiyu,*	*niji.*		
There,	*hani,*	*ti-ha.*		
Tree,	*iya,*	*nya.*		
Turkey buzzard,	*nikye,*	*nekatu.*		
Water,	*nanda,* (stream)	*nanda.*		
White,	*chuhua,*		*suruna, suat.*	
Wind,	*to,*	*tiho.*		
Woman,	*chu,*		*soora,*	*sue, gŭi.*
Yellow,	*sine,*		*psi, shoin-ore.*	
I,	*gãá,*	*saho.*		
My,	*na,*	*nba.*		
One,	*gó,*	*ti-ghé, ticaó.*		
Two,	*hó,*	*haó.*		
Three,	*há,*	*haui.*		

I think that the above comparison will leave no doubt but that the Mazatec is affiliated with both these stocks. With regard to

the Chapanecan, no other supposition will explain the substantial identity of the words for:

Fire,	*nii*	and	*nio.*
Water,	*nanda*	and	*nanda* (stream).
Maize,	*nama*	and	*name.*
Tree,	*iya*	and	*nya.*
Lightning,	*kuata*	and	*koita.*
Night,	*nhyu*	and	*nyu-fui.*
Teeth,	*niyu*	and	*niji.*
Stone,	*noyo*	and	*nyugu.*
Cat,	*chito*	and	*tzitu.*
Here,	*ihndi*	and	*jande.*
One,	*gó*	and	*ticaó.*
Two,	*hó*	and	*hăó.*
Three,	*há*	and	*háui.*

Not less positive are the identities of the following words of the Mazatecan and Chibchan (Costa Rican) groups:

Sun,	*sui*	with	*chui* or *sua.*
Moon,	*sa*	with	*só, sie* (or *za*).
Ear,	*schical*	with	*quhyca, schuke.*
Eye,	*scheu*	with	*s'ócvo, ócua.*
Hair,	*coshé*	with	*schá, quyhé.*
Man,	*chi*	with	*he-chí-che.*
Woman,	*chu*	with	*sue, gŭi.*
Rain,	*tzi*	with	*siu.*
Sea,	*dachicu*	with	*dechequ-in.*
Foot,	*tzoco*	with	*tsuku.*

The words for the colors white, black, blue, yellow and red show rather remote, but, perhaps, actual resemblances. They have no analogy whatever with the Chapanecan color terms.

The ethnographic conclusion to which this comparison would lead is that the Mazatecas do not constitute an independent stock, but a branch of the Chapanec group, which was at some early date of its history largely infiltrated with blood of the Costa Rican tribes of South American descent. This may have arisen from the adoption of some large band, which had migrated across the mountains separating Costa Rica from Nicaragua. The Mangue branch of the Chapanecs lived in Nicaragua, in immediate proximity to these mountains, and must have been in frequent relations with the tribes beyond them.

But how explain the extensive journey from Nicaragua to the northern limits of the State of Oaxaca? Here an ancient tradition of the Mangues comes to our aid. It was preserved by Father Remesal in his *History of Chiapas*, and runs to the effect that at a remote time a considerable number of the Mangues departed from the shores of Lake Managua and journeyed to the north, into the territory of the Zoques. Remesal construed this to explain the origin of the Chapanecs of Chiapas; but the traditions of the latter do not acknowledge this derivation, and it is probable that the Mangues referred to some other division of their community. This may well have been that which conveyed a mixed dialect of Mangue and Costa Rican as far as the northern borders of Oaxaca.

We have also early evidence that a band of the Mangues, numbering about four hundred souls, occupied a town in the midst of the Costa Rican tribes, in the valley of Guaymi, fronting on the Golfo Dolce. There they were found by the Spanish explorers in 1563.* Doubtless they absorbed more or less of the language of their rulers, the Guaymis; and the following identities between the Mazatecan and the Guaymi vocabularies (published by Mr. Pinart in the *Revue d' Ethnographie*, 1887) seem conclusive.

	Mazatecan.	Guaymi.
Sun,	*sui,*	*shui.*
Moon,	*sa,*	*so.*
Head,	*tku,*	*θokua.*
Nose,	*nito,*	*nido-ñ.*

If these identifications are correct, they enable us to trace the influence of a South American linguistic stock as far into North America as the northern border of Oaxaca—a discovery full of significance for the history of the aboriginal culture of the central portion of the continent.

* Peralta, *Costa Rica, Nicaragua y Panama en el Siglo XVI*, p. 777 (Madrid, 1883).

On the Taxonomy of the Genus Emys, C. Duméril.

By Dr. G. Baur, Clark University, Worcester, Mass.

(*Read before the American Philosophical Society, January 1, 1892.*)

I have just read Prof. L. Vaillant's paper, "Sur la Signification taxinomique du Genre Emys, C. Duméril" ("Ann. Sc. Nat. Zool. et Pal.," vii^e^ série, Tome xii, No. 1, Paris, 1891, pp. 51–63). Prof. Vaillant attempts to show that the type of Emys is not *Emys orbicularis* L., as nearly generally admitted lately, but *Testudo picta* Schneider, now generally known under the name of *Chrysemys picta*, and I think he is correct in this. I am, however, unable to follow him in all his other conclusions. I should like to add first, that the name proposed by Brogniart in manuscript, before Duméril had used the French name, les Emydes, in 1804, had been "*Syrinx*." In Isidore Geoffroy-Saint-Hilair's paper on Trionyx, published in 1809, in "Ann. du Mus. d'Hist. Nat., Paris," Vol. xiv, I find the following note on page 3: "On lisoit dans le manuscrit demeuré au secrétariat de l'Institut jusqu'à la publication du volume des Savans étrangers le nom de *syrinx* au lieu de celui d'émyde, mais M. Duméril ayant depuis proposé ce dernier nom, M. Brogniart l'adopta lors de l'impression de son Mémoire."

Besides, I should like to state that the original paper of Brogniart, "Essai d'une classification naturelle des Reptiles," appeared for the first time in 1799, in the "Magazin encyclopédique, ou Journal des Sciences, des Lettres et des Arts," rédigé par A. L. Millin, Vol. vi, pp. 184–201, An. viii, 1799, and was reprinted in the "Bulletin des Sciences, par la Société Philomatique," No. 35, pp. 81, 82, Paris, Pluviose, an 8 de la République, and No. 36, pp. 89–91, pl. vi, Ventose, an 8 de la République (1800).

It was Michael Oppel* who, for the first time, used the fact already noticed by Schöpff, that in *Emys orbicularis* the front portion of the plastron is movable, to distinguish in the genus Emys three subdivisions.

"Subdivisiones secundum scriptores recentissimos.

"(*a*) Sterno antice mobili, *e.g.*, *Emys lutaria*.

"(*b*) Sterno cruciformi, *e.g.*, *E. serpentina*.

"(*c*) Collo longissimo, sub testam arcuate reflexa, non retractili, *e.g.*, *E. longicollis*."

E. serpentina was placed in a new genus, *Chelydra*, by Schweigger, in 1812 ("Königsberger Archiv für Naturwissenschaft und Mathematic," Vol. i, pp. 280, 292, 293, Königsberg, 1812),† and *E. longicollis* in the new genus *Chelodina*, by Fitzinger, in 1826.‡

* Oppel, Michael, "Die Ordnungen, Familien und Gattungen der Reptilien," München, 1811, p. 11.

† This is the original publication.

‡ Fitzinger, L. T., "Neue Classification der Reptilien," Wien, 1826, p. 6.

Brogniart, who proposed the Latin name "Emydes" in 1805 for Duméril's French name "les Emydes," had given the following species as belonging to it: *E. ferox, E. rostrata, E. matamata, E. lutaria, E. pensylvanica, E. clausa.*

E. ferox and *E. rostrata* belong to *Trionyx* Geoffroy, 1809; *E. matamata* to *Chelus* Duméril, 1806; *Chelys* Oppel, 1811.

It was Merrem * who divided the remaining species of Emys into two groups.†

(*a*) *Emys*—

"Digiti distincti, unguibus acutis.
Rostrum corneum.
Sternum immobile."

* Merrem, Blasius, "Versuch eines Systems der Amphibien," Marburg, 1820, pp. 22, 27. Merrem places the *Testudo lutaria*, with the following synonyms: *Testudo lutaria* L., *T. orbicularis* (*f*) L., *T. europæa* Schneid., *T. caspica* Gmel, among his Emys, not knowing that in this form the anterior part of the plastron is movable.

† I have to say, however, that Rafinesque had already, five years before, reached the same conclusion in a book which is very rare, but of which my friend, Mr. S. Garman, has a copy. I have to thank Mr. Garman for copying for me the part relating to the Testudinata. The title of the book is "Analyse de la Nature ou Tableau de l'Univers et des corps organisés," Palerme, 1815. On page 75 we find:

"*Cryptephia.* Les Cryptephiens.

"Carapace inférieure à 1 ou 2 valves mobiles; enfermant les membres comme dans une boite.

"G. 3. *Cheliphus* R.; 4. *Uronyx* R.; 5. *Didicla* R.; 6. *Monoclida* R.

"*Emydania.* Les Emydiens.

"Carapace ni coriace, ni à valves mobiles, pieds à doigts libres ou palmés.

"G. 7. *Emyda* R., *Emys* Dum.; 8. *Chemelys* R.; 9. *Chelopus* R.; 10. *Chelyda* R., *Chelys* Dum.; 11. *Cheliurus* R."

Unfortunately Rafinesque did not give the names of any species with the new genera, nor did he give any characters. From a later paper, which was written in 1816, but not published before 1832, we receive some information by Rafinesque (Rafinesque, C. F., "Description of Two New Genera of Soft-shell Turtles of North America," *Atlantic Journal and Friend of Knowledge*, Vol. 1, No. 2, Philadelphia, summer of 1832, pp. 64, 65.

"*Cheliphus* Raf. Water turtles with valved shells, 5 claws and toes to all the feet.

"*Uronyx* Raf. An anterior valve to the shell, toes and claws 5 and 4, tail with a claw. *T. scorpioides*, etc.

"*Didicla* Raf. Bivalve lower shell, toes 5 and 4. Type *T. clausa, odorata*, etc.

"*Monoclida* Raf. Lower shell valvular anteriorly, toes 5 and 4. *T. retziana*, etc.

"*Chemelys* Raf. Warty scales, no valves, 4 toes to all the feet. *T. verrucosa*, etc.

"*Chelopus* Raf. No valve, toes not palmated 4 and 5. *T. punctata*, etc.

"*Cheliurus* Raf. No valves, feet palmated, a long scaly tail. *T. serpentina*, etc."

The group with movable valves, named Cryptephia by Rafinesque, contains, therefore, the genera *Sternothærus* = Cheliphus; *Cinosternum* = Uronyx = Monoclida; *Cistudo* = Didicla, part.

The group in which the valves are not movable, named *Emydania* by Rafinesque, contains the genera *Emys* = Emyda; *Clemmys* = Chemelys = Chelopus; *Chelydra* = Cheliurus.

(*b*) *Terrapene*—

"Digiti distincti, unguibus acutis.
Rostrum corneum.
Sterni lobo anteriore, aut utroque mobili."

Two years later, in 1822, Fleming established the genus *Cistuda* * for the tortoises, in which the entrance to the cavity is formed by a lid. *Cistuda* is simply a synonym of Merrem's *Terrapene*, and has to be abandoned therefore.

In 1825, Gray† follows Merrem, adopting the genera Emys and Terrapene (written Terraphene); "*Cistuda* Say" is declared a synonym of *Terrapene*.

In the same year Bell ‡ published an important paper not mentioned by Prof. Vaillant, in which he shows that *T. europæa* Schneid. (*orbicularis* L.) has to be included in "*Terrapene* Merrem, *Cistuda* Say." He says of *T. orbicularis* L.: "On examining sometime since a shell of this species, the first I had seen, which had lost the sternum, I was struck with the appearance of the articular surface from which that part had been removed, and immediately concluded that it must belong to the present group, having a movable breastplate, notwithstanding Merrem, to whom belongs the credit of having separated the 'Box Tortoises' under his subgeneric division Terrapene, retains this species amongst his Emydes, the character of which, on contradistinction to *Terrapene*, is that the sternum is entire and fixed. On consulting Schöpff, I found that, with his usual accuracy, that author had mentioned the movable structure of the sternum, and subsequent observations have established my first conjecture that it belongs to this genus."

Now this leaves no doubt whatever that from 1825 the name Emys could not be applied to T. orbicularis L., but that this species belonged to Terrapene; and since Terrapene Merrem is the same as Oppel's subdivision, with Emys lutaria as type, this species, which is now known as E. orbicularis L., has to be considered the type of Terrapene.

Gray § follows Bell in 1831, but uses now the name *Cistuda* of Fleming, which he calls *Cistuda* Gray, not Cistudo as remarked by Prof. Vaillant.

* It is difficult to say whether this name *Cistuda* is a misprint or not. It could either stand for *Cistula*, from *cista*, the diminutivum of *cista*, which means a small box, or for *Cistudo*, formed in the same way as *Testudo* from *testa*. It seems that Duméril and Bibron introduced the name Cistudo for the first time in 1835.

† Gray, John Edward, "A Synopsis of the Genera of Reptiles and Amphibia," "Ann. of Philos.." Vol. ix, pp. 210-212, London, 1825.

‡ Bell, Thomas, "A Monograph of the Tortoises, having a Movable Sternum, with Remarks on their Arrangement and Affinities," *Zoölog. Journ.*, Vol. ii, pp. 299-310, London, 1825.

§ Gray, J. E., "A Synopsis of the Species of the Class Reptilia," p. 7; published as Appendix to Vol. ix of Cuvier's "Animal Kingdom," edited by Edward Griffith, London, 1831. In the same year appeared another separate edition, with additions: Gray, John Edward, "Synopsis Reptilium, or Short Descriptions of the Species of Reptiles," London, 1831. The original paper was written October, 1830; the second edition of it in January, 1831.

In 1828, Ritgen* subdivided the genus *Emys*, in *Emys* and *Clemmys*, and retained *Terrapene* Merrem.

The following species are united with *Clemmys*: *E punctata, planiceps, glutinata, centrata, subrufa, melanocephala.* Of these *E. punctata* Schöpff = *T. guttata* Schneider, has to be considered as type.

As correctly stated by Prof. Vaillant, *T. picta* Schn. has to be considered as type of Emys, and *Chrysemys* Gray, 1844, becomes therefore a synonym of Emys.

The first author who subdivided the *Terrapene* Merrem, as limited by Bell in 1825, was C. L. Bonaparte,† who separated the American box tortoises under Fleming's name *Cistuda* in 1830 and 1831, from Emys, with *T. orbicularis* as the type.

In 1836, Fitzinger proposed a new name, *Pyxidemys*, to contain the following species: *T. carolina* L. (*T. scheideri* Schweigg., *T. virgulata* Daud.), *Sternothærus trifasciatus* Bell, and *T. amboinensis* Daud. If there would be an objection to the name Cistuda in the sense of Bonaparte, Fitzinger's name *Pyxidemys* ought to be used with the *T. carolina* L. as type. But I think it will be the best to use the name *Cistuda* in the correct form of *Cistudo*.

As a result we have the following:

Emys C. Duméril, s. str.	= Chrysemys (Gray),	Type	*T. picta* Schneider.
Terrapene Merrem	= Emys (Boul.)	"	*T. orbicularis* Lin.
Cistudo Bonap. non Flem.	= Cistudo (Boul.)	"	*T. carolina* Lin.
Cyclemys Bell	= Cyclemys (Boul.)	"	*E. Dhor* Gray.
Clemmys Ritgen	= Clemmys part (Boul.)	"	*T. guttata* Schn.

I have shown some time ago that in *Cistudo major* Agassiz, the zygomatic arch is complete (*Science*, April 3, 1891, p. 190), as in *T. amboinensis* Daud., notwithstanding I believe that the Asiatic and American forms are generically separate. I am unable to say whether *T. amboinensis* Daud. belongs to the genus *Cyclemys* Bell, with *E. Dhor* Gray as type, or not. Prof. Vaillant is inclined to place *T. amboinensis* in a genus distinct from *Cyclemys* Bell, for which he uses the name Terrapene. The correct name would be *Cuora* Gray, introduced in 1855.

The whole question relating to the taxonomy of Emys Duméril may be developed in the following table:

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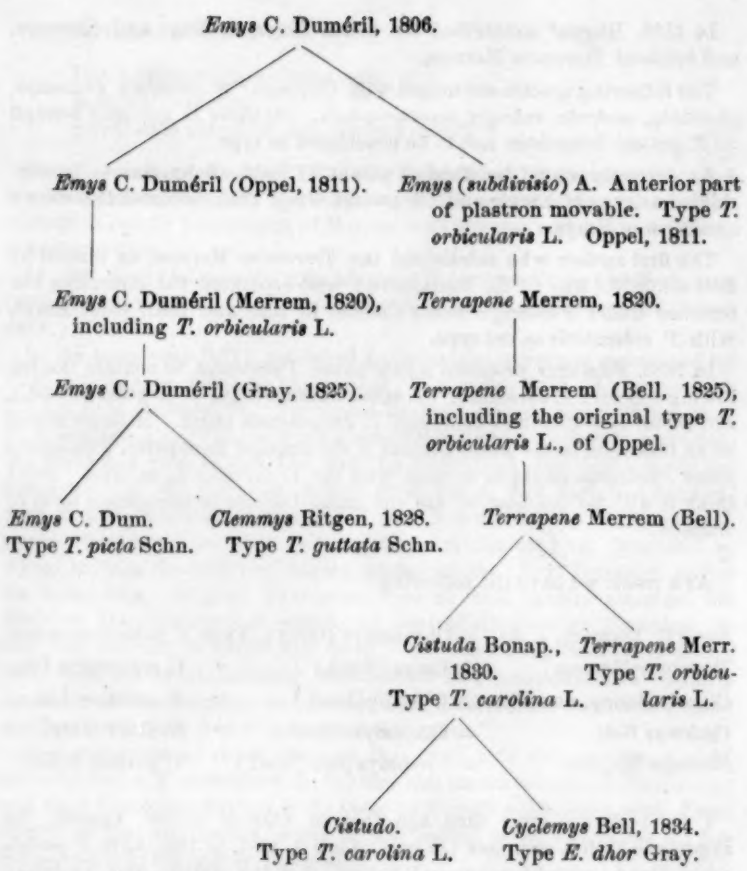
* "Ritgen, F. A., Versuch einer natürlichen Eintheilung der Amphibien," "Nova Acta Nat. Cur.," Vol. xiv, pp. 257–284, Bonn, 1828.

† Bonaparte, C. L., "Osservazioni sulla seconda ediziona del Regno Animale del Barone Cuvier," Bologna, 1830. And "Saggio di una distribuzione metodica degli Animali Vertebrat Giornale Arcadico di Scienze," etc., Roma, Vol. xlix, 1831.


Emys C. Duméril, 1806.
Emys C. Duméril (Oppel, 1811).
Emys (*subdivisio*) A. Anterior part of plastron movable. Type *T. orbicularis* L. Oppel, 1811.
Emys C. Duméril (Merrem, 1820), including *T. orbicularis* L.
Terrapene Merrem, 1820.
Emys C. Duméril (Gray, 1825).
Terrapene Merrem (Bell, 1825), including the original type *T. orbicularis* L., of Oppel.
Emys C. Dum. Type *T. picta* Schn.
Clemmys Ritgen, 1828. Type *T. guttata* Schn.
Terrapene Merrem (Bell).
Cistuda Bonap., 1830. Type *T. carolina* L.
Terrapene Merr. Type *T. orbicularis* L.
Cistudo. Type *T. carolina* L.
Cyclemys Bell, 1834. Type *E. dhor* Gray.

I place now the views of Boulenger, Vaillant and myself together:

Baur.	*Vaillant.*	*Boulenger.*
Emys C. Dum., s. str. Type *T. picta* (Herrm. MSS.) Schn.	*Emys* C. Dum., s. str. Type *Emys picta* Schöpff.	*Chrysemys.*
Clemmys Ritgen. Type *T. guttata* Schn.		*Clemmys.*
Terrapene Merrem. Type *T. orbicularis* L.	*Cistudo* Gray. Type *Cistudo orbicularis* L.	*Emys.*
Cistudo (Cistuda Flem.) Bonap. Type *T. carolina* L.		*Cistudo.*
Cyclemys Bell. Type *Emys Dhor* Gray.	*Cyclemys* Bell. Type *Cyclemys dhor* Gray.	*Cyclemys*, part.
Cuora Gray. Type *T. amboinensis* Daud.	*Terrapene* Merrem. Type *Terrapene amboinensis* Daud.	*Cyclemys*, part.

The only modification in Boulenger's catalogue necessary is to change his *Chrysemys* in *Emys*, and his *Emys* in *Terrapene*.

Studies in South American Native Languages.

By Daniel G. Brinton, M.D.

(*Read before the American Philosophical Society, February 5, 1892.*)

Introductory.

It is not too much to say that the languages of the native tribes of South America are the least known of any on the globe. The problems they present in their grammatical character and affinities remain the furthest from solution, and the materials to undertake such a task are the scantiest from any equal area on the earth's surface. In spite of the labors of such earnest workers as Von den Steinen, Ehrenreich, Adam, Ernst, Darapsky, Middendorff and others, there are numerous tongues of which we know absolutely nothing, or have but bare and imperfect vocabularies.

In the present series of studies I present a variety of material from either unpublished or rare works, accompanied by such suggestions as to its character and relations as have occurred to me in its preparation, and by some observations on the ethnography of the tribes mentioned. As I am convinced that the only ethnographic classification possible of the native tribes of America is that based on language, I do not hesitate to apply this whenever possible.

I.

THE TACANA GROUP.

In my work on *The American Race*,* I offered the following classification of this group:

Tacana Linguistic Stock.

Araonas,	*Isuiamas,*	*Pukapakaris,*	*Tumupasas,*
Atenes,	*Lecos,*	*Sapiboconas,*	*Tuyumiris.*
Cavinas,	*Maracanis,*	*Tacanas,*	
Equaris,	*Maropas,*	*Toromonas,*	

From this list we must strike out the *Atenes* or *Atenianos* and *Lecos*, as I shall show that these spoke a tongue nowise akin to the

* *The American Race: A Linguistic Classification and Ethnographic Description of the Native Tribes of North and South America.* By Daniel G. Brinton. 1 vol., 8vo, pp. 392 (N. D. C. Hodges, New York, 1891).

Tacana, in spite of some assertions to the contrary by Spanish writers.

Other tribes which should probably be added to this list, as they are located on old maps within Tacana territory and have Tacana names, are:

Carangues, on left bank of Rio Tarabeni.

Chumanos, north of Lake Roguaguado.

Poromonas, on the lower Rio Beni (or Poro).

Samachuanes, on Rio Coroico.

Uchupiamonas, on the Rio Uchupiamona.

Yubamonas, on the Rio Yuba.

The termination *monas* to several of these names is the Spanish plural form of the Tac. *manu*, river, the tribes being named from the streams along which they lived.

In addition to the above I have found that the tribe known as "Guarizas" is to be included among the Tacanas. A series of texts in their language, comprising the Pater, the Ave and the Credo, was found among the papers of Cardinal Mezzofanti, and has been published by Prof. Emilio Teza in his *Saggi inediti di Lingue Americane* (Pisa, 1868). The learned editor states that all his endeavors to identify this language, or to ascertain the location or affinities of the tribe, had been fruitless. A comparison of the Guariza Pater with that in the Tacana, both of which I give on a later page, will prove the very close relationship of the two tribes.

D'Orbigny asserts that "Tacana" is not the name of a tribe, but the name of the language. It is called by Spanish writers of the last century the "Maracani,"* which is apparently not the same as the *Macarañi* of the mission of Santiago among the Chiquitos.

The earliest missionary explorer of the Rio Beni, Fray Francisco de Rosario, wrote a report in 1677, in which he mentions a number of tribes, now extinct, among them the Hucumanos and the Torococyes, whose names indicate them to have belonged to the Tacana stock.†

Location and Number.

The general location of the Tacana group may be described as along the eastern slope of the Cordillera, where it descends to the

* See D'Orbigny, *L'Homme Américain*, Vol. i, p. 374; *Descrip. de las Misiones del Alto Peru* (1771).

† His report was printed in full in Melendez, *Tesoro Verdadera de las Indias*, Tomo iii.

valley of the river Beni (otherwise called the Rio Poro, the Rio Pilcopata and the Rio Madre de Dios), and in the valley of the latter on both banks, between South lat. 12° and 15°. At present the Tacana dialect proper is spoken in the towns of Tumupasa and Isiamas; the Araona by the Araonas, who dwell on the banks of the Beni and on those of its western tributaries, known as the Manuripi, Tahuamanu and Uaicomanu; the Cavineño is confined to the mission of Cavinas; the Maropa to the Maropes, in and near the Pueblo de los Reyes, on the right bank of the Beni, about 12° 30′ S. lat., while the Sapis or Sapiboconas appear to have been the most eastern branch of the stock, as they were attached to the mission of the Moxos in the province of that name on the Rio Mamore.

In 1831 the total number of persons speaking the dialects of this stock was about 6000 (D'Orbigny). The majority of these are nominally Christians and have fixed habitations; but the Toromonas, who dwell between the rivers Madidi and Beni, in 12°–13° South lat., are still uncivilized and heathens; so, also, are the Araonas, who are stated to be cannibals and idol worshipers. Their idols are geometrically shaped pieces of polished wood and stone. Their chief deity is "Baba Buada," whom they identify with the wind, *vutana*, and whose home is in the air. He is said to live towards the south and to be the creator of heaven and earth. The general term for divinity is *edutzi*, and there is a *zia edutzi*, god of maize; an *agave edutzi*, god of health, etc. Each *edutzi* has his own *yanacona*, or priest, to superintend the proper rites.*

Loan Words.

The Tacana-speaking tribes have for generations adjoined on the west the once powerful and cultivated Aymaras, and on the north the populous herds of the Panos. The consequences on their tongue have been quite marked. A number of words have been borrowed from both sources; but they are not so frequent nor of such a character as to authorize the supposition of an original unity with either of the stocks named. I give a list of some of these:

Identities in Aymara and Tacana.

	Aymara.	Tacana.
Arm,	*ampara*,	*embai*, M.
Body,	*amaya*,	*eami*, M.

*E. Heath in *Kansas City Review*, April, 1883; Col. Labré in *Proc. Roy. Geog. Soc.*, 1889; Nic. Armentia, *Explor. del Madre de Dios.*

	Aymara.	Tacana.
Boat,	*huampu,*	*cuambá,* M.
Cold,	*t'aarata,*	*bruada,* T.
Earth (patria),	*marca,*	*mechi,* S.
Green,	*chojna,*	*china,* T.
Heaven,	*alakhpacha,*	*evacua pacha,* T.
House,	*utax,*	*etai,* M.
Island,	*huatta,*	*eda-pupu,* T.
Lightning,	*llipikh-llipikh,*	*jüli-jüli,* M.
Man,	*chacha,*	*drejà,* M.
Meat (flesh, body),	*aycha,*	*aicha,* T.
Morning (Span. *mañana*),	*maylla,*	*maita,* M.
Night,	*aruma,*	*apume,* M.
Old,	*achachi,*	*esi,* M.
Star,	*huara,*	*erujái,* T.

Identities in Pano and Tacana.

	Pano.	Tacana.
Blood,	*imi,*	*ami.*
Child,	*abaque,*	*ebacua.*
Flesh,	*nami,*	*yami.*
Hill,	*matsy,*	*emata.*
Moon,	*bari,*	*bari.*
Small,	*hata,*	*bata.*
Son,	*omibaque,*	*qui embaque.*
Sun,	*uirti* (star),	*ireti.*
Tongue,	*ãna,*	*eana.*
Uncle,	*cucu,*	*cucu, juju.*
Water,	*jena,*	*ena.*

The only two numerals which can be claimed for the Tacana evidently also belong to the Pano:

	Tacana.	Pano.
One,	*pea,*	*atchou-pé, pa-jũ.*
Two,	*beta,*	*ta-bœ, ru-bã.*

The important words for maize, salt, tobacco and banana seem to be borrowed from other tongues:

Maize, *shije* or *dije.*—Probably the Pano *schequi,* which in turn is undoubtedly the Kechua *cherchi,* roasted maize. The grain evidently became known to the Panos as an article of food in this prepared form.

Salt, *banu.*—Apparently a variation of the Arawak *pamu.*

Tobacco, *umara* or *umarsi.*—Doubtless, from the Tupi *put-uma,* Maypure *iema.*

Banana, *bondare* and *naja*.—The former is the Pano *banara, panala*, and *naja* is the same word with the first syllable omitted ; *banara* is but a corruption of *banana*, an Arawak word.

The color names appear to me irreducible, except that for "green," which has been borrowed from the Aymara.

White,	*pasana.*
Black,	*devena.*
Blue,	*danane.*
Red,	*derena.*
Yellow,	*tidnia.*

A few similarities to the Moseteño, a language spoken by a neighboring stock, may be noted :

	TACANA.	MOSETEÑO.
Fish,	*see,*	*señ.*
Foot,	*euatsi,*	*yú.*
God,	*edutzi,*	*dogit.*
Water (river),	*ena,*	*ogñi.*
Woman,	*epuna,*	*phen.*

But these have little significance.

PHONETICS.

All the Tacanan dialects are facile and agreeable in their sounds, differing in this respect from the Aymara and Kechua, both of which are harsh to the European ear and almost unpronounceable to a foreigner. The Araona has no sound which is not capable of correct expression by the Spanish alphabet; but the Tacana has the strong English *th* (as in *this*); a soft, scarcely audible aspirate, and a sound intermediate between *t*, *d* and *r* (heard in *dudu*, brother ; *tata*, father, etc.), while the soft Spanish *th* (as in Span. *ce*, *ci*) is absent. The *l* is not heard in any native Tacana word.

The statement quoted by D'Orbigny, from a MS. of one of the missionaries, to the effect that the Tacana is one of the most guttural and harshest of languages, is quite incorrect and could not have been intended to apply to any of the dialects of this group.

PRONOUNS.

The paradigms of the Tacana pronouns are as follows :

I,	*ema.*	We,	*ecuana.*
Of me *or* mine,	*quiema.*	Of us, our,	*ecuanasa.*
For me,	*quiemapuji.*	For us,	*ecuana puji.*

To me,	*ema.*	To us,	*ecuana.*
With me,	*ema neje.*	With us,	*ecuana neje.*
Thou,	*miada.*	You,	*micuana.*
Thine,	*miqueda.*	Your,	*micuanasa.*
For thee,	*mique puji.*	For you,	*micuanapuji.*
To thee,	*mida.*	To you,	*micuana.*
With thee,	*mi neje.*	With you,	*micuananeje.*
He or she,	*tueda.*	That,	*ichu.*
Those,	*tueda cuana.*	Those,	*ichu cuana.*
His or her,	*tuseda.*	This one,	*jida.*
This,	*yhe.*	These ones,	*jida cuana.*
These,	*yhecuana.*	Who?	*aydeni.*

Verbal Forms.

Of all the dialects the Tacana is richest in verbal forms, and its various subdialects are less variable than its neighbors.

Further, Armentia states that all the dialects have a dual number in both verbs and pronouns, but his work does not furnish the means of analyzing the character of this dual. As is well known to grammarians, there are several very different conceptions of duality in language.

The notion of action in the verbal theme undergoes modification by suffixes, thus:

ha, to make, to do.
e-hatani, I am doing (*e* = *ema* = I).
e-hametani, I am ordering it to be done.
aque, imperative, do ye.
atique, go thou and do.

Of such suffixes, *ja* expresses desire or to wish, as:

puti-ja, I wish to go.
dia-ja, I wish to eat.
idi-ja, I wish to drink.

The suffix *ji*, appended to a noun, signifies possession, as *chipilo-ji*, one having money; but reduplicated and suffixed to a verb, it conveys the sense of past time, as:

puti-jiji, he has already gone.
dia-jiji, he has already eaten.

The termination *ti* appears to be that of the reflexive verb:

dama, to cover.
ja damati, to cover oneself.

The neuter is changed to the active signification by the suffix *me*:

manu, to die.
manuame, to kill.
ja manuamejiji, he who has killed another.

Many verbs are compounded by simple juxtaposition, as:

babe, to know; *quisa*, to tell; whence:
babequisa, to teach, *i. e.*, to tell what one knows.

The word *babe*, to know, is itself a derivative from *ba*, to see, which also appears in such compounds as *diaba* (from *dia*, to eat), to eat, seeing, *i. e.*, to test or try a food (*probar la comida*); and *batsuatique* (*tsuati* = above), to look upward.

Literature and Texts.

The literature of the Tacanan dialects—if I may apply this term to such meagre material—is widely scattered and difficult of access. Ludewig, in his *Literature of American Aboriginal Languages* (p. 206), speaks of it as a dialect of the Yurucare, with which it has not the slightest affinity. The same author gives the Sapibocona as a dialect of the Kechua (p. 168), and the Maropa as related to the Yuracare.

Of the Tacana proper I have made use of three published vocabularies: 1. That given by H. A. Weddell, *Voyage dans le Nord de la Bolivie* (Paris, 1859). He gives forty words and six numerals, obtained from a party of Tacanas from Ixiamas and Tumupasa, whom he met at Guanay. 2. A vocabulary of one hundred and fifty-seven words and six numerals, by Dr. E. R. Heath, contributed by him to the *Kansas City Review*, April, 1883. 3. A vocabulary of forty-eight words and ten numerals, accompanied by grammatical observations by the Rev. Nicholas Armentia, published in his *Exploracion del Rio Madre de Dios* (La Paz, 1889).

The only printed text I have found is a small octavo of forty-one pages, with the following title:

"Catecismo | de la | Doctrina Christiana | en Idioma Tacana |

por un Misionero del Colejio de | Propaganda—fide de la | Paz de Ayacucho | 1859. | Imprenta de Vapor.—Calle de la Aduana, No. 36.

The text is entirely in Tacana, without the corresponding Spanish, and embraces the Pater, Credo, Salve, Smaller Catechism, Explanation of the Doctrine, the Via Sacra, etc. I have been unable to discover the author.

Further, Armentia gives also vocabularies of the Araona and Cavineño dialects, and Dr. Heath supplies one of the Maropa. For the Sapibocona, I have relied on that printed by Hervas in his *Vocabulario Poliglotto.*

Dr. Heath refers to the great similarity between the Maropa and Tacana dialects, and adds the remark: "The Maropas have many words that have significations widely different; *etra* means bone and also hair; *biya* means a louse, a wasp and urine." Probably there is a difference in accent or inflection, which is not apparent to the European ear, but which to the native indicates which sense is intended.

The version of the Lord's Prayer given below, as well as that of the Creed, are taken from the *Catecismo en Idioma Tacana*, above referred to. I have added an interlinear translation of the former, and also a translation of the latter, as there is evidently some slight change of the customary phraseology.

Lord's Prayer in Tacana.

Ecuanasa tata evacuapachasu, mi canichanapajiji papu mique ebani,
Our father heaven in, thou sacred come thy name,
mique evacuapacha ecuanasa papu, mique enime eni papu ye canasu,
thy heaven (to) us come, thy wish come earth on,
evacuapachasu epuani nime viame. Amen Jesus. Pamapa zinesu ecuanasa
heaven in come (like to?). Amen Jesus. Every day our
equita tucheji jeave ecuanatiaque. Ecuanasa jucha cuana chenubaque,
body food to us. Our sins forgive,
cuaja bata ecuaneda eichenubania ecuanasa manu cuana, ba ecuana
even as we forgive
dajajameji mi juchasu, inasiguaque pamapa madada cuanasu. Amen
remove all evil us from.
Jesus.

Alongside of this I quote the same in the Guariza dialect, from Prof. Teza's work, already mentioned:

Lord's Prayer in Guariza.

Echeza tata evacuepachazu anigi mi, ibbubatagigicapapuini mige evani, echebe pezu papu eyucaini mi reyno, agigicapapuini mige enime eubbazu evacuepachazu batanja. Ecama geabe chinezu tiage echeza jana pugi: echebe jucha gigicuana ichenubage echeza jucha çetahu, tuevata ecama echeza majaycuana eichenubbaza: ecama tucheme age veca par'ajaja juchazu, chuteme jubua ichenume cuanazu ecama viapenege.

It is evident that this is a version by a different hand into a closely allied dialect.

Creed in Tacana.

I believe in the Father God, of all things in heaven and on earth the maker; I believe in the Lord Jesus Christ, His only Son; who was conceived by the grace of the Holy Spirit, and was born of a virgin; he suffered under the power of Pilate; he was crucified; he died; he went down to limbo; from among the dead he arose on the third day; he went up to heaven; there he is seated on the right hand of the Father almighty; whence he shall come to judge the living and the dead; I believe in the Holy Spirit, the holy Catholic church, the communion of all the saints, the pardon of sins, and that our bodies shall rise again, and that life shall not end.

Eama jei eania tata Dios pamapa aji, evacuapachasu ye eausu seguameji; jei eania tata Jesucristo tusa evacua peada quita; bataji puida Espiritu Santasa gracia eje putzu; etsesa cuara Virgen cuinaida; ichenuda cuana vidinaida Pilatosa emesu; tatajiji puida crususu; dapia manujiji puida, limbosu buteida; manujiji cuana dujusu nettianaida quimicha zinesu; soatida evacuapacha, mesa tata pamapa aji bai eni bene cani, da jenettia epueicha eideni cuana, manujiji cuana equisaba puji; eama jei eania Espiritu Santosa, santa Yglesia catolicasu, santo cuanasa aysaida jacti cuanasa jaditati, jucha cuanasa perdon, ecuanasa equita quita eydeyo pupebæ mave eide cani.

Vocabulary—English-Tacana and Dialects.

T.=Tacana (T. W.=Tacana of Weddell); M.=Maropa; S.=Sapibocona; A.=Araona; C.=Cavineño.

Orthography Spanish; *j*=Eng. *h*; *h* scarcely perceptible; *z*=Eng. *th*.

Alive, *eicle'ja*, T.; *escheveve*, M.
All, *pamapa*, T.; *huana'*, M.
Always, *daja-pincha*, T.
Arm, *ebu'e*, T.; *embai*, M. (probably from *ema*, hand).
Arrow, *pisa*, T.; *pizi*, M.
Ascend, to, *tsuati*, T.
Ashes, *etimu*, T., A.; *etiquimuru*, C.
Aunt, *nene*, T., A., C.
Bad, *mada'da*, T.; *emasa'*, M. (=*ma-saida*, not good).
Bark (of tree), *eviti*, T.; *embiti*, M.
Beard, *que'da*, T.; *eüesa'*, M.
Belly, *etu*, T.; *ese'*, M.; *edde*, T. (W.)

Bird, *dia*, T.; *bu'ni*, M.
Black, *devena*, T.; *sebe'mi*, M.
Blood, *ami*, T. and M.
Blue, *danane*, T.; *savame'*, M.
Body, *equita*, T., C.; *ea'mi*, M.; *ecuicha*, A.
Bone, *e'tro*, T.; *etra'*, M.
Bow, a, *pisatri*, T.; *pizatrue*, M. (see *Arrow*).
Boy, *canane*, *edeave*, T.; *dreja've*, M. (see *Man*); *toro*, A.; *ebacuapi*, C. (see *Child*; *ve* is the diminutive suffix).
Breasts (=mammæ), *atru*, T. and M.
Brother (my elder), *quema-onici*, T.; *be'tri*, M.
Brother (my younger), *quema-cou'*, T.; *chintri*, M.
Brother, *zau*, *uitzecua*, A.; *jau*, *usi*, C.
Canoe, *cua'bua*, T.; *cuamba'*, M., A.; *cuaba*, C. (Aymara).
Charcoal, *etide*, T.; *etesi*, A.; *etirutseve*, C.
Chest, the, *etredu*, T.; *echentru*, M. (breast bone? see *Bone*).
Child, *ebacua*, T.
Cold, *bruada*, T.; *vinna'ma*, M.
Come, to, *pue*, T.; *apueya*, M.; *papu*, T.
Cry, to, *tsia-tsia*, T.; *jejaje*, M. (imitative).
Dance, to, *tiri-tiri*, T. and M. (imitative).
Daughter, my (by father and mother), *onibaquapuna*, T.; *quiembaqua*, M.; *ebacuepuna*, A., C. (see *Child* and *Woman*).
Day, *tri'ne*, T. and M.; *chine*, S.
Dead, *manujiji*, T. and M.
Deer, *ba'que*, T.; *batru'nu*, M.
Die, to, *manu*, T.
Dog, *vchi*, T.; *pacu*, M.
Drink, a, *ayeidi*, T.; *eidi*, A.; *eigi*, C.
Drink, to, *idi*, *eicli*, T.; *jaischitri*, M.
Duck, a, *se'e*, T.; *zu'zi*, M.
Ear, *edaja*, T.; *eshacue'na*, M.
Earth (land), *medi*, *edua*, T.; *metri*, M.; *mechi*, C., S.; *eua*, *mezi*, A.
Eat, to, *dia-dia*, T.; *chancha*, M.
Egg, *e'ja*, T. and M.
Evening, *trineti'a*, T.; *trinequa*, M. (see *Day*).
Eye, *etradru'ndru*, T.; *etachundru*, M.; *etuachùru*, S. (see *Sister*, *Elder* and *Hair*; apparently "sister hairs," *i. e.*, eyebrows, eyelashes).
Face, *embu*, T. and M.
Father, my (by son), *rema-tata*, T.; *qui-tata*, M.; *tata*, or *checua*, S. C.
Father, my (by daughter), *rema-tata*, T.; *qui-tata*, M.
Far, *uqueda*, T.; *huazumi*, M.
Feathers, *eina*, T.; *enuqua*, M. (compare *Hair*).
Fingers, *ema*, T.; *emechuja*, M. (=head of hand).
Fire, *qua'ti*, T.; *cua'ti*, M., S., A.; *etiqui*, C.; *otro*, T. (W.) (compare *Ashes* and *Wood*).
Fish, *sisi*, M.; *see*, T.; *jæ*, A.
Flesh (see *Meat*, *Body*).
Fly, a, *vere-vere*, T.; *bebi*, M. (imitative).
Food, *jana*, T., A.; *etduca*, C.
Foot, *equatri*, T.; *evatri*, M.; *ebbachi*, S.; *euatsi*, A., C.
Forehead, *emali*, T.; *emma'ta*, M. and S.
Forest, *eji'je*, T.; *hayjintru*, M.
Friend, *apare'je*, T.; *epere'je*, M.
Girl, *putu*, *epunave*, T.; *punave*, M.; *ebæzacua*, A.; *ebacuna*, C. (*ve*=diminutive; see *Child*, *Daughter* and *Woman*).
Give, to, *tia*, T.; *tia'na*, M.
Go, to, *pu'ti*, T. and M.; *puj*, A.; *cua*, C.
God, *eruchi*, S.; *edutzi*, T., A.; *educhi*, C.

Good, *saida, saipiave,* T.; *jundra,* M.
Grass, *nutsa,* T.; *ea'ji,* M.
Great, *aida,* T.; *haymi,* M.
Green, *china,* T.; *schepiĕi,* M.
Hair, *echu-ena,* T.; *etra,* M.; *echau,* S. (see *Head, Feather, Wing*).
Hand, *e'ma,* T.; *eme,* M., S., A.; *eme-tucu,* C.
He (pron.), *tu-eda,* T.; *tu-ve,* M.
Head, *echu,* T.; *echuja,* M. and S.; *echua,* A.; *iyuca,* C.
Heart, *masu'mo,* T.; *masumu',* M.; *emofobo,* A.; *eniju,* C.
Heaven, *evacuepana,* S.; *evacuapacha,* T.; *buepo,* T. (W.).
Here, *upi'ca,* T.; *iezu',* M.
Hill, a (or mountain), *emata,* T.; *emina,* M. (probably from *ema,* extremity, point, hand).
Hot, *sina'da,* T.; *zintri-trime,* M.
House, *ejtej,* T.; *etai,* M., A.; *etare,* C.
Husband, my, *quemayavi,* T.; *quiave,* M.
I (pron.), *ema* (active form, *ea'ma*), T.; *e'me,* M.
Ice, *ea'na,* T.
Infant, *canane-chidi,* T. (see *Boy*); *ejanana,* M.
Iron, *peama',* M.
Island, *edapu'pu,* T.; *ischa'pupu,* M.
Jar (Sp. *olla*), *jutu,* T., A.; *emaricaca,* C.
Kettle, *co'to,* T.
Kill, to, *manuame, emanuani,* T.; *mane'me,* M.
Knife, *cuchilo,* M. (Spanish).
Know, to, *babe,* T.
Lake, *bai,* T. and M.; *eubihure,* S. (see *Water*).
Laugh, to, *ydeba'ti,* T.; *yaschi-bati,* M.
Leaf, a, *equena',* M.
Learn, *babe tsua,* T.
Leg, *etida'da,* T.; *eta',* M.; *etta,* T. (W.).
Lie, to, *bidumimi,* T.; *ea'na,* M.
Lightning, *tseru-tseru,* T.; *jili-jili,* M.; *ilapa,* S.
Love, to, *esbune'ba,* T.; *imbunimbu,* M.
Maize, *dije,* T.; *shije,* M.; *zia,* A.
Make, to (Sp. *hacer*), *ha,* T.
Man, *de'ja,* T., C.; *dreja,* M.; *reanci,* S.; *deja, ecuicha,* A.
Many, *yucua'da,* T.; *dru'je,* M.
Meat, *aicha,* T.; *ea'mi,* M.; *yami,* A.; *erami,* C.
Money, *chipilo,* T.
Moon, *ba'di,* T., A., C.; *tantri',* M.; *bari,* S.
Morning, *matachu,* T.; *mai'ta,* M.
Mother, my (by son or daughter), *quema-qua'ra,* T.; *quicua,* M.; *cua,* S.; *uaua-di,* A.; *cuaha',* C.
Mouth, *aquatri,* T.; *equa'tra,* M.; *ebbo,* T. (W.).
Musquito, *sani* or *di,* T.; *dri,* M.
My, *quema,* T.; *qui,* M.
Name, *ebani,* T.; *embani,* M.
Nails, *ema-tichi,* T.; *eme tichi,* M. (see *Hand*).
Near, *narise,* T.; *drema',* M.
Neck, *eti'pi,* T. and M. and S.
Never, *niquietsunu.*
Night, *liza,* T.; *apume',* M.
No, *ma've,* T. and M.
Nose, *evi-eni,* T.; *evi,* M. and S.
Old, *ecti,* T.; *e'si,* M.
Our, *ecuanasa,* T.
People, *endrani,* T.; *driani qua'na,* M.
Plantain (Sp. *platano*), *nasa,* T.; *naja,* A.; *bondare,* C.
Prairie, *nutsa'ni,* T.
Rain, *nai,* T. and M.
Rattlesnake, *bacua dada,* T.; *sum bacua,* M. (see *Snake*).
Red, *derena,* T.; *utrume,* M.
River, *ena,* T.; *manu,* A.; *exepereарida,* C. (*ena* = water).
Rivulet, *enabaque,* T. (= child-water).

Road, *edidi*, T.; *edisi*, A.; *edigi*, C.
Run, to, *judu'du*, T.; *vandrundu*, M.
Salt, *banu*, T.; *bano*, M.
Say, to, *quisa*, T.
See, to, *ba*, T.; *jam-bati*, M.
Silver, *depe*, T.; *sepe*, A.
Sing, to, *satsu*, T.; *zatru*, M.
Sister, *zatna*, A.; *tatna*, T.; *nasi*, *jane*, C.
Sister, my elder, *quema-du'du*, T.; *drundru*, M.
Sister, my younger, *quematona*, T.; *la'na*, M. (in M. eldest brother says *cani* to his youngest sister).
Sit, to, *aniu'ti*, T.; *animbotia*, M.
Skin, *ebbai*, T. (W.).
Sky, *bueyu'pa*, T.; *embaquapacha'*, M.
Sleep, to, *tabi*, T. and M.
Small, *chicli*, T.; *batavi'chi*, M.
Snake, *bacua*, T. and M.
Son, my (by father or mother), *quema-embami*, T.; *qui-embaqua*, M.; *ena*, A.; *ebacua*, T. C. (see *Child*, *Daughter*).
Soul, *enidu*, T.; *ejiay*, A.; *yata-ecuana*, C.
Speak, to, *mimi*, T. and M.
Squash, a, *je'nu*, T.; *je'mi*, M.
Stand, to, *enutsinejenetsi*, T.; *ne'ti*, M.
Star, *eru'jai* or *etubay*, T.; *buana'vi*, M.; *etujay*, A.; *purari*, C.
Steal, to, *tsi*, T.; *tri*, M.
Stone, *tumu*, T., C., A. and S.; *tuma*, M.
Strong, *tuche'da*, T.; *tretremi*, M.
Sun, *ire'ti* or *ideti*, T.; *isjeti*, M.; *igeti*, C.
Teach, to, *babe-quisa*, T.
Teeth, *etre*, T. and M.; *éche'*, T. (W.) (compare *Bone*).
That, *ychu*, T.; *ichu*, M.
There, *chupia*, *dapiavi*, T.; *ichuzu*, M.
They, *ychu-cuana*, T.; *tuna've*, M.
Think, to, *piba*, T., A.; *adeba*, C.
This, *yhe*, T.; *iye*, M.
Thorn, *aquida*, T.; *acuisa*, A.; *acuija*, C.
Thou, *mi-cla*, T.; *mi-ve*, M.
Thumb, *ema-chuai*, T.; *eme-chuja*, M. (see *Hand*, *Fingers*, *Head*).
Thunder, *etiria'ni*, T.; *ti'ri*, M.
Tobacco, *umar'si*, T.; *umaza*, M.
To-day, *jeave*, T. and M.
To-morrow, *maita-pûicha*, T.; *bantra*, M. (see *Yesterday*).
Toes, *equatri-ritrana*, T.; *evatri-tichi*, M. (see *Foot* and *Nails*).
Tongue, *eana*, T., M. and S.
Tortoise, *dati*, T.; *dra'ti*, M.
Town, *eju'de*, T.; *ejuntre'*, M.; *ererc*, A.; *epu*, C. (see *House*).
Tree, *a'qui*, T. and M.; *acui*, A., C.
Uncle, *juju*, T., A.; *cucu*, C. (a celebrated word, probably of Carib origin, on which Martius founded his classification of the "Guck" nations).
Walk, to, *arease'*, T.; *aze*, M.
Warrior, *jamaji tipuji* (a quarrelsome person), M.
Water, *eavi*, T.; *yu'vi*, M.; *euvi*, S., A.; *ena*, C.; *ya'ni*, T. (W.).
We, *ecuana* (dual form, *etsea*) T.; *ecama'*, M.
When, *quietsunu*, T.
White, *pasana*, T.; *paza'me*, M.
Who, *ayde'ni*, T.; *hayse*, M.
Wife, *quema-equani*, T.; *quievane*, M.
Wind, *be'ni*, T. and M. (from this comes the name of the Rio Beni = Wind river).
Wing, *enabay*, T.; *ennambai*, M. (see *Feathers*).
Wish, to, (Span. *querer*), *tsada*, T.
Woman, *epuna*, *a'no*, T.; *a'nu*, M. and S.; *epuna*, C., A.
Wood, *ei'na*, T.; *a'qui* (= tree), M.; *cuati-manu*, A.; *cuati*, C. (see *Fire*).

Work, to, *mudumudu*, T.; *mundru*, M.
Ye *or* you, *micuana*, T.; *mica've*, M.
Year, *mara*, S.
Yellow, *tidnia*, T.; *zahuami'*, M.
Yes, *ehe*, T.; *ee*, M.
Yesterday, *maita püicha*, T.; *maita*, M. (see *To-morrow*).
Young, *edea-ve*, T.; *dreja-veve*, M. (= young man).

Numerals.

1, *pea, peada, peara*, T.; *pembive*, M.; *pebi*, S.; *equene*, Cat.
2, *beta*, T., M. and S.
3, *quimicha*, T.; *camischa*, M. (Aymara).
4, *pusi*, T. and M. (Aymara).
5, *pichica*, T. and M. (Aymara).
6, *sucuta*, T. and M. (Aymara).
7, *siete*, T. (Spanish).
8, *ocho* (Spanish).
9, *nueve* (Spanish).
10, *tunca*, M. (Aymara); *peara tunca*, T.
20, *beta tunca*, M. (Aymara).

Tacana–English Vocabulary.

Aicha, meat, flesh.
Aida, great.
Ami, blood.
Aniuti, to sit.
A'no, woman, wife.
Apareje, friend.
Aquatri, mouth.
Aqui, tree.
Aquida, thorn.
Arease, to walk.
Atru, mammæ.
Aydeni, who.
Ba, to see.
Babe, to know.
Babe-quisa, to teach.
Babe-tsua, to learn.
Bacua, snake.
Bacua-dada, rattlesnake.
Badi, moon.
Bai, lake.
Banu, salt.
Baque, a deer.
Beni, wind.
Beta, two.
Bruada, cold.
Bueyupa, sky.
Dudu, sister (elder).
Canane, a boy.
Cani, sister (by brother).
Chicli, small.
China, green.
Chipilo, money.
Chupia, there.
Cosi, younger brother.
Coto, kettle.
Cuabua, canoe.
Cuati, fire.
Daja-piucha, always.
Danane, blue.
Dapiave, there.
Dati, tortoise.
Déja, man.
Depe, silver.
Derena, red.
Devena, black.
Dia, bird.
Dia-dia, to eat.
Dije, maize.
Eana, tongue.
Ea'na, ice.

Eavi, *water*.
Ebani, name.
Ebbai, skin.
Ebue, arm.
Echu, head.
Echuena, hair.
Ecli, old.
Ecuana, we.
Ecuanasa, our.
Edeave, young.
Edidi, road, path.
Edaja, the ear.
Edapupu, island.
Edeave, a boy.
Edua, earth, land.
Ehe, yes.
Eicleja, alive.
Ei'na, wood.
Eina, feathers.
Eja, an egg.
Ejije, forest.
Ejtej, house.
Ejude, town.
Ema, or *eama*, I.
E'ma, hand, fingers.
E'ma-chuai, thumb.
Emali, forehead.
Emata, hill.
E'ma-tichi, nails.
Embami, son.
Embu, the face.
Ena, river.
Enabay, wing.
Enidu, soul.
Epuna, woman, wife
Equani, wife.
Equatri, foot.
Equatri-ritrana, toes.
Equita, body.
Eruchi, god.
Erujai, star.
Eshuneba, to love.
Etidada, the leg.
Etide, charcoal.
Etimu, ashes.
Etlpi, neck.
Etiriani, thunder.
Etra driendru, the eye.
Etre, tooth.
Etredu, the chest.
Etro, bone.
Etu, belly.
Etubay, star.
Evacuepacha, heaven.
Evieni, nose.
Eviti, bark of a tree.
Ha, to do, to make.
Idi, to drink.
Ireti, sun.
Jana, food.
Jeave, to-day.
Jenu, squash.
Judu'du, to run.
Juju, uncle.
Jutu, jar.
Liza, night.
Madada, bad.
Macta puicha, to-morrow or yesterday.
Manu, to die.
Manuame, to kill.
Manujiji, dead.
Masumo, heart.
Matachu, morning.
Mave, no.
Medi, earth, land.
Micla, thou.
Micuana, you.
Mimi, to speak.
Mudu mudu, to work.
Nai, rain.
Narise, near.
Nasa, plantain.
Nene, aunt.
Niquietsuna, never.
Nutsa, grass.
Nutsani, prairie.
Onibaquapuna, daughter.
Onici, elder brother.
Pumapa, all.
Pea, one.
Peama, iron.

Piba, to think.
Pichica, five.
Pisa, arrow.
Pisatri, a bow.
Pue, to come.
Pusi, four.
Puti, to go.
Putu, girl.
Quara, mother.
Queda, beard.
Quema, my.
Quietsunu, when.
Quimicha, three.
Quisa, to say, to tell.
Saipiave, good.
Sani, musquito.
Satsu, to sing.
Se'e, a duck.
Sinada, hot.
Sisi, fish.
Sucuta, six.
Tabi, to sleep.
Tata, father.
Tia, to give.
Tidnia, yellow.
Tiri-tiri, to dance.
Tona, sister (younger).
Trine, day.
Trinetia, evening.
Tsada, to wish.
Tseru-tseru, lightning.
Tsi, to steal.
Tsia-tsia, to cry.
Tsuati, to ascend.
Tucheda, strong.
Tu-eda, he.
Tumu, a stone or rock.
Uchi, a dog.
Uitzecua, brother.
Umarsi, tobacco.
Upica, here.
Uqueda, far.
Vere-vere, a fly.
Yavi, husband.
Ychu, that.
Ychucuana, those, they.
Ydebati, to laugh.
Yhe, this.
Yucuada, many.
Zatna, sister.
Zau, brother.

II.

THE JIVARO LANGUAGE.

The material which I have to present on this language is entirely from unpublished sources, and is the more valuable as, so far as I know, not even a vocabulary of this important idiom has ever been printed.

The Jivaros (Givaros, Xivaros, Hibaros, Xeberos, etc.) are a numerous and powerful nation, mostly yet in a savage state, who dwell about the head waters of the rivers Paute, Morona, Santiago and other upper affluents of the Marañon, between 2° and 4° 30′ South latitude, where they occupy the eastern slope of the Cordilleras. I have described their general culture and history in my work on *The American Race*, pp. 282–284.

They are said to present the peculiarity of unusual lightness in color, and features of a decidedly Aryan type.* These traits have

* "Aujour d'hui le type caucasique y domine," says Father Joseph M. Magalli, in *L'Année Dominicaine*, Paris, 1888.

been usually explained by a supposed extensive infusion of Spanish blood when their ancestors captured the city of Logroño in 1599 and carried off the white women as wives. More probably they share, with the Yurucares, Tacanas and other Andean nations, the peculiarity of a complexion several shades lighter than that of the Kechuas and Aymaras.

They have been little influenced by European visitors. A recent authority states that there are scarcely a hundred and fifty Christian families in the whole of the immense province of Canolos, a part of which they inhabit, and the area of which is more than 8000 square leagues.*

The sources which I have had at command are two MSS. in the British Museum, the name of the author not given, but from some remarks probably a German Jesuit, who was a missionary to the tribe towards the close of the last century.

The titles are:

"*Vocabulario en la Lengua Castellana, la del Ynga, y Xebera.*" Small 8vo, fol. 35. The vocabulary embraces about 1300 words, and is apparently complete.

"*Gramatica de la Lengua Xebera.*" Same size. This MS. is imperfect, leaves being lacking both at the beginning and the end.

From these MSS. I have prepared the following sketch of this tongue.

Phonetics.

The sounds of the language are described as difficult to a European and fluctuating in character. The indistinct and alternating nature of certain phonetic elements appears in the Jivaro as in so many American tongues.

In vowel sounds, the *o* is often confounded with the *u*, the *e* with the *i*, and the *e* with the *œ*, which is like the German *ö*. The complex vowel sound represented by *ôu*, as in *pôung*, fire, is especially difficult for a foreigner. The vowels *a* and *o*, when followed by *i*, are often elided.

The consonants *d*, *l*, *r* and *h* are frequently alternated (that is, the one sound may be used at will for the other), or an indistinct sound is uttered, which may approach any one of them. The *n* is

* So says Father Magalli, above quoted, but the knowledge of this writer falls far short of what is requisite when he adds of the Jivaros and Japaros, "Ils parlent tous la même langue, le Quichua" (!).

frequently omitted or uttered so slightly as to be scarcely audible. In the syllables *quec* and *qued* the final consonants are rarely clear, and both often have the sound q'^{r}. In the vocabulary the *ö* and *sch* should be pronounced as in German.

Nouns.

The relations of nouns are indicated by suffixes, *e.g.* :

Tana, the forest.
Tananquec, to the forest, or, in the forest.
Tanancla, from the forest.

Some words indicate the genitive relation by the termination *qui*.

Nouns may be formed from verbals by the suffix *ni* or *bi*, as *timinlec*, I die; *timipi*, the dead person, the corpse; also by the suffix *asu*, as *dacotalec*, I am ashamed; *dacotasu*, one who is ashamed. The infix *cuda* has the same effect.

The instrumental sense is conveyed by the termination *c*, which is the abbreviation of *quec* or *quecla*.

Seotic, knife.
Seotic quec, with a knife.

"With," in the sense of accompaniment, is expressed by *lec*, as:

Sadasulec, with a married man.
Paparulec, with my father.

Direction from is indicated by the termination *quecla*; "for" or "instead of" by *maleg*, as:

Natquimaleg, for or in place of another.

Pronouns.

The personal pronouns are:

I, *coa, qûa.*
Thou, *quenma.*
He or she, *nana.*
This one, *asu.*
We, *cuda, queñmoa, mapoa.*
You, *queñma'ma.*
They, *nauba, nanalosa, nanadap'r-losa.*
Those, *asudap'rlosa.*

The possessives are:

Mine, *quaqui, ru, ca.*
Thine, *quenmaqui, palin, ma.*
His, *nanaqui.*
Our, *cudaqui, mapoa.*
Your, *quenmamaqui, palenma.*
Their, *nanaqui.*

The second forms above given are suffixes or infixes, as:

Sudaru, my husband.
Sudapalin, thy husband.
Loantacasu, my desire.
Loantamasu, thy desire.
Loantasu, his desire.

As usual in American languages, there is no relative pronoun, its place being supplied by participial constructions.

Number and Gender.

Names of inanimate objects usually undergo no change in the plural. For persons the plural is formed by adding the suffix *losa* or *nanlosa*. In possessives the plural suffix is often *na*, as:

Hucha, a sin.
Huchaneng, his sin.
Huchanengna, his sins.

Saden, his wife.
Sadena, his wives.

In verbals and verbs the plural termination may be *dōc*, as:

Huchapidōc, sinnings.

Anulao, leave me.
Anulaodōc, leave us.

Infixes may be employed in place of these suffixes, especially in nouns derived from adjectives and participles. The most usual of these is $a^{t}_{,}$, as:

Nambilec, I live.
Nambiasu, he who lives, the living man.
Nambia$^{t}_{,}$casu, those who live, the living.

The syllable *ma*, used either as infix or suffix, also conveys the plural sense, as:

Pulen, thine.
Pulenma, your.

Feminines are distinguished by the suffix *lu* or *llu*, as *vila*, boy; *vilalu*, girl; *lus*, man; *luslu*, woman. Also apparently by a change of another vowel to the *u*, as we find, *sadalec*, married man; *sudalec*, married woman.

Numerals.

The ancient cardinal and ordinal numbers of the Jivaros were as follows:

1, *ala.*
2, *catu.*
3, *cala.*
4, *encatu.*
5, *alacötegladu* (*ala*, one; *ötegla*, hand; *du*, termination).
6, *intimutu* (the thumb, of the second hand).
7, *tannituna* (the index finger, of the second hand).
8, *tannituna cabiasu* (=the finger next the index).
9, *bitin ötegla cabiasu.*
10, *catögladu* (=two hands).

This cumbrous plan has long been superseded by the adoption from the Kechua of the names of numbers above five, so that the present numeration is:

1,	*ala.*	5,	*alacötegladu.*	9,	*iskon.*
2,	*catu.*	6,	*sokta.*	10,	*chunka.*
3,	*cala.*	7,	*ganchis.*	100,	*pazai.*
4,	*encatu.*	8,	*pusac.*		

Particles.

A marked feature of this tongue, which it shares with so many others on the American Continent, is the abounding use of particles to modify the meaning of roots and themes. Whether these are to be regarded as themselves the remnants of worn-down themes, or as primitive phonetic elements, is a yet unsettled question, though for myself I incline to the latter opinion. The MS. I am quoting gives a long list of such significant particles, the most important of which are as follows:

a or *ha* indicates causative action on another; as *uranlec*, I eat; *auranlec*, I cause another to eat.
apa or *pa* denotes present action, as *nambilec*, I live; *nambiapalec*, I am now living.
ata or *anda* is a suffix denoting an interrogation.
cun, as an infix, denotes action about to take place.
ilala, as an infix, signifies that the action is of a permanent character.
imbo, as an infix, conveys a negative sense, and is often employed with the regular negative, *cola.*

itu, inserted before the termination of verbs, indicates that the action is done for another.

la, infixed, signifies that the action is for this one time only.

misan, infixed, conveys the sense that the action is shared by all present.

na, as a suffix, indicates habit, as *intulina*, he who is habitually in a bad temper.

nunda, infixed in the present tense, denotes that the action takes place at some other time; as *notonundalec*, I do it (am accustomed to do it, but am not doing it now).

pa or *mba*, an affirmatory suffix.

qui, as an infix, denotes that the action takes place where the speaker is at the time.

ti is a frequent euphonic suffix, which does not alter the meaning.

van, as suffix or infix, denotes possession; as *huchavanlosa*, those who have sins.

vanan, like *itu*, signifies action for another; as *muchavananamasu*, thou who asks for us.

ya or *nara*, as a prefix, intimates a wish or desire; as *palec*, I see; *yapalec*, I wish to see.

yn, as a prefix, denotes reciprocal or mutual action; as *yainmali*, they desire to take each other (in marriage).

Verbs.

The verbs have but two tenses, the present and the future. Occasionally the adverb *epa*, now, is prefixed to define the present, and *nuca*, pl. *naupa*, to denote a past time.

The formation of the future is frequently irregular, but the following examples will show its usual forms. It alone appears to present a dual number.

	Present. Singular.	Future. Singular.	Future. Dual.	Future. Plural.
I do,	*notolec*,	*notetic*,	*notoa*,	*notoaua*.
I take,	*malec*,	*matic*,	*maa*,	*maaua*.
I love,	*tandeñlec*,	*tandeñetic*,	*tandeña*,	*tandeñaua*.
I speak,	*laonlec*,	*laontic*,	*laona*,	*laonaua*.
I die,	*timinlec*,	*timintic*,	*timiantala*,	*timiantalua*.
I pray,	*malealec*,	*maleatic*,	*maleaa*,	*maleaua*.

The imperative is formed by the termination *qued*, often abbreviated to *q'r*; as *tecalec*, I run; *tecaqued*, run thou. Other terminations of an imperative character are *tan*, *aner*, *licaa* and *ma*.

The substantive verb is not found in the language, its place being supplied by terminations, especially the pronouns *cu* or *sucu*, etc., as *Pedrocu*, I am Pedro; *Pedroquenma*, thou art Pedro; *moim-*

bosucu, I am bad. In a similar sense the verb *nolec* or *nilec*, I do thus, I am thus, is often heard.

There is no trace of a true passive voice, its place being supplied by the sense of the verb or by particles.

At the conclusion of his MS. the author inserts two versions of the Lord's Prayer—the one "in the Xebera language, as it was spoken in the earliest times of the mission," the translation being that of Father Lucas de la Cueva (about 1655); the second in the language of the period of the writer, which I suppose to have been about one hundred and fifty years later.

Of the second or later of these I have ventured an interlinear translation, while the former I insert without a rendering.

Lord's Prayer in Jivaro—Later Version.

Papa mapoa, mosninanloquec napala; linlinpalin nomisansu muchai;
Father our, heaven in art thou; name thy holy become;
quenmaquinlosamasu cudaquec unadiai; loantamasu nomisansu notoi
thy kingdom us to come; desire thy holy be
maponsu mosninanloquec, nanaposu pilaasu lupaquec unda; uglilosa
as heaven in, earth in; daily
tandamapoa epala ugli encaodec; cudaqui huchabidöc anuladöc, maponsu
bread our now to-day give; our sins forgive, as
quenmoa unda alapila dape'dlosaqui huchanengna anulalidöc; anerata
we others their sins forgive;
quenmoa dentatutan, quenmoa cola Dios ayuaimbocaquec; nanamengtu
our our us
moimbosuöuegla atiegodac.
evil from deliver.

Lord's Prayer in Jivaro—Earlier Version.

Papa mapoa, mosenquec napalac linlinpalin ruchapalin; quenma quilosamasu cudaquec undiai. Loantacasu notetiuma mapolina mosninanloquec inosupila asumincenloquec unda. Uglilosa tanda epala ugli encaodöc nulaodöc cutaqui hudabidöc; dengquina cuda anulalidöc aubaqui hucha nengna; anerata apolata muchaquec amengdana; moimbocasuquegla atiego.

English-Jivaro Vocabulary.

Above, *mosenqûec.*
Ankle, *tula.*
Arm, *da'mpa.*
Arrow, *na'mu.*
Ashamed, to be, *dacotalec.*
Ask, to, *mucha.*
Bad, *moâimbosu, aperosu.*
Beard, *amucuiola noteri,*
Belly, *du', metpi, oquiulec.*
Below, *vilenquec.*

Bird, *ilans'r, tiperllu.*
Black, *catli, cadladasu.*
Blind, *dapina.*
Blood, *uogladec.*
Blue, *carcaso.*
Body, *loqueglo, timipi.*
Bone, *lansi.*
Born, to be, *oclilec.*
Boy, *vila.*
Branch, *taümec.*
Brave, *nan'tapi.*
Breast, *mudin, titoi.*
Brother, *yalli, yuyu'uc.*
Burn, to, *ügedalec.*
Buy, to, *ucolatolec.*
Calabash, *pabi.*
Call, to, *pöclolec.*
Child, *babi.*
Clothing, *capi.*
Come, to, *undialec.*
Cold *no'qûed, noq'r.*
Cotton, *piterlu, boûngpalo.*
Cover, to, *patantulec.*
Dance, to, *danzalec.*
Dawn, to, *ügliti.*
Day, *'ugli.*
Dead, *timiansu.*
Dear, *llada, nünilu.*
Death, *töminacasö.*
Deer, *boro'.*
Dog, *nini.*
Drink, a, *huasu, ülec.*
Drink, to, *upailacu.*
Drum, *tundo.*
Dwell, to, *nambilec.*
Ears, *bûec.*
Earth, land, *lu'pa.*
Eat, to, *calec, uranlec.*
Egg, *cado.*
Elbow, *quög'da.*
Enemy, *quegma.*
Enter, to, *da'lec.*
Eyes, *llada, da'pila.*
Face, *llada* (see *Eyes*).
Feather, *ambo'lu.*
Female, *cuapr*^{n}.
Field, *tiq'n ñaua.*
Finish, to, *tavantulec.*
Fire, *poung.*
Fish, *samer, lapisamed.*
Flesh, meat, *canan.*
Flint, *mosed.*
Flute, *pi'leaña.*
Flower, a, *dancu.*
Food, *ca'lo'.*
Foot, *la'ndec.*
Forehead, *teqûeda'.*
Forest, *tana.*
Girl, *vilalu.*
Give, to, *n'galec.*
Go, to, *palec.*
Gold, *uri.*
Good, *môa, moali.*
Grandfather, *papaiangu.*
Grandmother, *ami'.*
Great, *cuni, chi, halupi.*
Green, *canin'rtia.*
Grow, to, *zuzulec.*
Hair, *hintic.*
Hammock, *ta'la.*
Hand, *ötegla.*
Have, to, *nali, napali.*
Head, *uma.*
Hear, to, *la'oclec.*
Heart, *cangan.*
Heaven, *mosninanlo.*
Herb, *puma, daubad.*
High, *chi.*
Hill, *mutopi.*
House, *pi'dec.*
How? *mapoli.*
Hot, *ucasu.*
If, *aa, n'tati.*
In, *pa'lec.*
Indian, *muda, cuapr*^{n}.
Iron, *huana'.*
Kill, to, *atiminlec.*
Knee, *toto'pi.*
Knife, *scotic.*
Know, to (things), *nintitulec.*
(persons), *loatulec.*
Lake, *sangna.*

Last, *na'pi.*
Learn, to, *nintitanalec.*
Life, *nambiacasu.*
Light, a, *ugli, ocli.*
Light a fire, to, *atengtulec.*
Lightning, *yümerlec.*
Lip, *ü'tec.*
Live, to, *nambilec.*
Lizard, *tuda, lili.*
Love, to, *tan'deñlec.*
Maize, *tötrⁿ, tötrlla.*
Man (vir), *queñmopineñ.*
Married man, *sadalec.*
Married woman, *sudalec.*
Medicine man, wizard, *pichotasu muda.*
Monkey, *duda, isolo, lolo.*
Moon, *ducat.*
More, *hapia.*
Most, *halupi, mointi.*
Mother, *auauc.*
Mouth, *lala'.*
Much, *cupi, bapo.*
Name, *linlin* or *lintin.*
Navel, *mumu'la.*
Near, *pa'ula.*
New, *na'lu.*
Night, *dogpili.*
No, *cola.*
Nose, *ne'tic.*
Now, *epala.*
Old, *tas'serpi.*
Old (man), *tas'pitosu.*
Old (woman), *tas'serllu.*
Open, to, *höquêrlec.*
People, *vapomuda.*
Pray, to, *malealec.*
Raft, *sudu'.*
Rain, to, *ölaⁿ, olanli.*
Rainbow, *podo'na.*
Red, *pip'rasu, togua.*
Road, *degaun.*
Root, *ötecnin.*
Run, to, *tecalec.*
Salt, *lamu'la.*
Say, to, *tulec.*
See, to, *lölec, löapalec.*
Semen, *miladöc.*
Send, to, *piuglec.*
Shade, shadow, *dachu'na.*
Sierra, *obituna.*
Sin, a, *hucha.*
Sing, to, *peclalec.*
Silver, *culiqued.*
Sister, *chayauc, cadecuc.*
Sleep, *bitilec.*
Small, *hamecha.*
Smoke, *cadlo* or *callo.*
Snake, *daua.*
Soul, *vada, timipi.*
Spaniard, *vadan.*
Speak, to, *laonlec, lalalec.*
Star, *tandola.*
Stick, *na'la, unguña.*
Strong, *nantapi.*
Sun, *quö'qui.*
Sweet, *yali.*
Take, to, *malec.*
Tame, *daiali.*
Tapir, *pahuala.*
Teach, to, *anintitulec.*
Throat, *unqued.*
Thumb, *intimutu.*
To, *qûec.*
Tobacco, *pinterlo, uhualec.*
Tongue, *ninegla.*
Tooth, *la'tec.*
Totem, clan, *patun.*
Town, *ninan'lo.*
Tree, *nala, squig'uinti.*
Turtle, *mado.*
Uncle, *aprcha.*
Valley, *sa'caⁿ.*
Virgin, *inilad.*
Wall, *lupa, patenpi.*
Water, *döc.*
White, *dadapua'su.*
Who, *deng.*
Wind, *tanlo'a.*
Within, *que'negla.*
Without, *a'dipi.*
Woman, *cuaprⁿ, sada.*
Wood, *deboc.*
Yellow, *chapicaso.*

III.

THE CHOLONA LANGUAGE.

Nothing has heretofore been printed of the language of the Cholonas. This tribe dwells on the left bank of the upper Huallaga river, between 8°–9° 30′ South latitude. They were visited by Edward Pœppig in 1829, when he found them to number about 1000 souls, scattered in missions on the banks of the Monzon, Uchiza, Tocache and Pachiza, small streams flowing into the Huallaga. At the close of the last century they occupied a mission with the Hibitos or Xibitos, and together numbered about 5000.* Pœppig asserts that the Hibitos speak a wholly different tongue, but this is denied by my MS. authorities, who acknowledge only a dialectic difference; but the German traveler is correct in his statement that some of the wild Chunchos of the Sierra belong to the same stock.

My source of information in regard to this language is a MS. in the British Museum, entitled *Arte de la Lengua Cholona.* Its author was Fr. Pedro de la Mata, who wrote it in Truxillo in 1748, from which original the MS. in question is a copy made by Fr. Geronimo Clota, in San Buenaventura del Valle, in 1772. It is a small octavo of 132 folios and is complete. Fathers José de Araujo and Francisco Gutierrez wrote also *Artes* of these dialects, but I have not discovered their manuscripts. There is also a MS. *Arte de la Lengua Cholona,* apparently anonymous, mentioned by Ludewig, *Lit. of Amer. Aborig. Langs.*, p. 162.

The Cholona is a language extending over a small area, but it seems connected with no other, forming an independent stock. The only analogies worth mentioning which I have noted point towards dialects of the Arawak stock. For instance:

Sun, *muxac.* This seems = *kamu saache,* "the shining sun," of the Moxos.

Moon, *pel;* allowing for *r* = *l,* this is close to the *pueri* of the Jucuna dialect.

Eye, *nache;* reminds one of the *nuchii* of the Canamirim; the *nacuque* of the Uirina, etc.

Tooth, *alê;* again allowing *r* = *l,* this is the *ari* of the Goajiro.

Black, *zaluch* or *chaluch; ghulek* in Araicu.

White, *chech; ghalik* in Araicu.

* See my *American Race,* p. 288.

Whether these analogies are sufficient to classify it with the Nu-Arawak groups of Von den Steinen is doubtful. The differences in the personal pronouns especially seem to isolate it from the dialects of that stem.

Phonetics.

The letters *b*, *d*, *r* and *f* are lacking in the Cholona alphabet. The soft *ch* (as in "choose") alternates with the soft *th*; the latter is represented in the Spanish alphabet by *z*, so that in the *Arte*, *z* and *ch* are interchangeable. Initial *g* is hard before all vowels. The vowel represented by *o* is stated to be between *o* and *u*, and is probably the neutral vowel (as *u* in "but"). The initial *i* seems to represent a slight aspiration, as *iayu* or *hayu*, man. The elements *ñ* and *ñg* appear to be nasals.

The accent always falls on the last syllable, except in some verbal forms, where it is found on the penult. Pœppig says that the sound of the spoken tongue is disagreeable to the European ear.

Nouns.

The relations of the nominal theme are indicated by suffixes, which may be arranged to appear like a declension, though not really such.

Nom.—*iayu* or *iayutup*, the man.
Gen.—*iayuilou*, of the man.
Dat.—*iayuhe* or *iayuge*, to the man.
Acc.—*iayute* or *iayutu*, the man.
Voc.—*iayuey* or *iayupey* (fem.), O man.
Abl.—*iayute* or *tep*, *pat*, *nic*, with or by the man.

The plural is formed by the insertion of the particle *loi*, before the case ending.

nunlol, the men.
nunlolloula, of the men.
nunlolge, to the men.
nunlolte, the men (accus.).
nunloltep, with or by the men.

The case endings are used only when required to render the meaning clear, as *Juantup Pedro ilami*, Juan killed Pedro, where the accusative termination is omitted, that of the nominative sufficiently indicating the relation. Certain particles also give a plural

sense, in which case *lol* is omitted. These are *mec*, all; *pullem*, along with; *comec*, *incomec* and *pemec*, signifying quantity, and *manmiñ*, as many as. Whenever the plural is indicated by the form of the attached pronoun, other plural signs may be omitted.

There is no grammatical distinction of gender in nouns, difference of sex being indicated by the terms *nun*, male; *ila*, female, which may be either prefixed or suffixed, as:

Man, *nuniayu* or *iayunun*.
Woman, *ilaiayu* or *iayuila*.
Boy, *nunpullup*.
Girl, *ilapullup*.

A neuter or epicene gender can be denoted by a suffixed *ô*, as *nunô*, a person.

Various suffixes are added to nouns to modify their meaning, as:

nic, signifying excess or abundance.
su, signifying absence or negation.
camayoc, indicating knowledge of a subject or practice in it. This word is borrowed from the Kechua.

Pronouns.

The pronouns possess the prominence in this tongue which they so frequently show in American languages. All parts of speech can be grammatically inflected by their agency, and they generally suffice to indicate the plural without the insertion of the plural sign, *lol*.

The primitive pronouns are:

I, *oc*.	We, *quija*.
Thou, *mi*.	You, *minaja*.
He, *sa*.	They, *chija*.

The separable or independent possessives are formed by adding to the primitives the particle *alou*, with slight euphonic changes:

Mine, *ocalou*.	Ours, *quihaguilou*.
Thine, *mimilou*.	Yours, *mimilouha*.
His, *sailou*.	Theirs, *chihaloula*.

The inseparable possessives are those prefixed to form the conjugation of verbs, and attached to certain classes of nouns. They are as follows:

My, *a-*.	Our, *qui-*.
Thy, *m-* (masc.), *p-* (fem.).	Your, *mi-* (both genders).
His (none).	Their, *chi-*.

In the transitions of verbs the pronouns are abbreviated and certain other forms used, as:

	Singular.		Plural.
1st.	*a.*	1st.	*q, c.*
2d.	*m* (masc.), *p* (fem.).	2d.	*m.*
3d.	*y, c, v.*	3d.	*pa, po, mo, la.*

In adjective nouns the former class are used with euphonic changes, as:

pallou, good, a good thing.
amallou, my good or advantage.
mimallou, thy good or advantage.
quimallou, our good or advantage.
mimallouha, your good or advantage.
chimallou, their good or advantage.
amallouven, it is to my advantage.

The possessives, which form inseparable prefixes to nouns, are united by means of various ellipses and euphonic changes. Example:

Yuca, *el.*

My yuca, *anel.*	Our yuca, *quenel.*
Thy yuca, *menel.*	Your yuca, *menelha.*
His yuca, *nel.*	Their yuca, *enel.*

Numerals.

The numerals are employed with the addition of particles indicating the nature of the objects counted. The most usual of these particles appears to be *zel* or *chil.* The absolute forms, without these suffixes, are as follows:

1,	*an.*	20,	*ip-lec.*
2,	*ip.*	30,	*ix-lec.*
3,	*is.*	40,	*minip-lec.*
4,	*minip.*	50,	*quioc-lec.*
5,	*quioc.*	60,	*ipzoc-lec.*
6,	*ipzoc.*	70,	*quili-lec.*
7,	*quilip.*	80,	*pac-lec.*
8,	*pac.*	90,	*ocon-lec.*
9,	*ocon.*	100,	*apichac.*
10,	*alec.*		

These offer little resemblance to any other tongue, though the words for 8 and 9 remind one of the Chinchasuyu *pak* and *iskon.*

VERBS.

All active verbs are conjugated by transitions, formed by prefixing the pronoun of the person acting, and inserting immediately after it the pronoun of the person or thing acted upon. Example:

amcollan, I thee love.
mayian, thou me watchest.
payian, he me watches.
asac apuchihan, my food me they give.
misac mapuchilan, thy food thee they give (masc.).
pisac papuchilan, thy food thee they give (fem.).
sac hapuchilan, his food him they give.
ysac apahapuchan, their food them I give.

These are forms of the verb *apuchan*, to put before one, a derivative from *amchan*, to put, to place. Other examples:

amcolecte ameñan, I thee wish to love.
macolecte mimenan, thou me wishest to love.
Diosqui ñgolecte quimenan, we wish to love God.
Diostup iccolecte ymeñan, God wishes to love us.

The variation in the third person plural in the transitions appears to depend on the following conditions:

mo is used when the transition is from the third person singular to the third person plural, as in the expression, "he loves them."

po where the transition is from any of the other persons, singular or plural, to the third plural, as:

apocollan, I love them.
mipocollan, thou lovest them.
quipocollan, we love them.
mipocollan, you love them.
chipocollan, they love them.

pa where the verb implies another object besides the direct one, as:

ychac apahapuchan, I give them their food.

la is employed when the transition is from the third person plural to some other person than this, as:

micollilatan, they love thee.

chi is confined to transitions from third plurals to third plurals, as:

chipocollan, they love them.

Syntax.

The construction of phrases will be seen from the following examples:

Liman nê yayu yzip pusimpat añantumilā chectan.
Sierra in men their houses straw with covered are.
"The houses of the Indians in the Sierra are covered with straw."

The noun *zip* and the verb *anantuman* have their pronouns in the third person plural, so the plural particle *lol* is omitted.

The word *chectan* is an abbreviation of *chi actan*, the third person plural of the verb *actan*, I stand, I am in a place. This verb is much used to signify a usual action with reference to a noun, as *cot actan*, I bring water; *zip actan*, I fix or arrange my house; *ayllan actan*, I make the bed, etc.

Ñanmac yayu izipte izoz pachacotan.
Each Indian his house in his idols keeps.
"Every Indian keeps idols in his house."

English-Cholona Vocabulary.

Armadillo, *xax, tacla.*
Bad, evil, *ixivaj.*
Black, *zaluch* or *chal.*
Boy, *nun-pullup.*
Die, to, *colhac.*
Drink, a, *axitlam.*
Drink, to, *axcan.*
Each, every, *ñanmac.*
Eyes, *nache.*
Father, *pa.*
Flesh, body, *aycha* (K.).
Food, *apuchan.*
Fox, *sup.*
Girl, *ila-pullup.*
Give, to, *allan.*
Good, *pallou.*
Green, *llin.*
Hair, *pe.*
Hands, *nen.*
Head, *tech.*
House, *zip, chip.*
Husband, *muluch.*
Idols, *izoz, ichoch.*
Lance or dart, *ulluc.*
Louse, *cullà.*
Love, to, *agollan.*
my love, *agole.*
my lover, *acoleuch.*
Maize, *cach.*
Man (homo), *iayu* or *hayu.*
(male), *nun.*
(married), *muluch.*
Moon, *pel.*
Mother, *pan.*
Mountain, sierra, *liman.*
Nose, *quexum.*
Not, nothing, *ma.*
Place, to, *amchan.*
Red, *llaca.*
River, *xocot.*
Road, path, *panâ.*
Rule, to, *capac* (Kechua).
Sick, *cama.*
Silver, *checho.*
Son, *pul.*
Soul, *zall* or *chall.*
Spittle, *ollê.*
Stars, *kenna.*

Straw, dry grass, *pusim.*
Sun, *muxac.*
Teeth, my, *alè.*
Tongue, *monzey.*
Town, *putam.*
Water, *cot.*
White, *cheeh.*
Wife, *zala.*
Will, wish, *men.*
my will, *amen.*
I wish, *amẽñan.*
Woman (female), *ila.*
ilajayu.
(married), *zala.*
Word, *hil.*
Yuca, *el.*

IV.

THE LECA LANGUAGE.

The Lecos of the river Beni have been erroneously included in the Tacana stock by D'Orbigny and later writers (including myself). The only material I have anywhere found of their language is a short vocabulary given in Weddell's *Voyage dans le Nord de la Bolivia* (Paris, 1859); but this is sufficient not only to take them entirely out of the Tacana group, but probably to place them in an independent position by themselves. As Weddell's book is not to be found in many libraries, I shall translate and rearrange his list of words and precede it with some remarks on the tribe and its possible affinities.

The Lecos are stated by Weddell to have resided originally on the Rio Tipuani and its affluent, the Rio Isuaya, whence they removed to the banks of the Rio Mapiri.

On Arrowsmith's map (1809) the "Rio de Lecos" is located as a branch of the Rio Beni, between 13° and 14° South latitude, in a region assigned to the "Samachuanes," though I suspect these are the "Muchanes" of other writers, and who, according to Weddell, are Mozotenos.

The mission of Aten, in the valley of the Rio Beni, is distinctly stated by an official authority in the last century to have been peopled by the Lecos,* so we must include in them the "Atenianos," whom D'Orbigny classed with the Tacanas.

A somewhat extended comparison has not furnished me with positive grounds for including the Lecos in any known linguistic group. Most of the analogies I have noted are with the Carib stock, and some of them are striking, but scarcely decisive.

* "En Aten se hablan la Leca por ser este Pueblo de Indios Lecos." *Descripcion de las Misiones del Alto Peru*, 1771.

Leca Analogies.

Sun, *he'no;* compare *bue'no* (Opone, Carib stock).
Moon, *kurea;* comp. *kede, siregu* (Carib dialects).
Water, *dua;* perhaps from Carib *tuna.*
Arrow, *uela;* not far from Carib *boule'oua.*
Arm, *bepel;* close to Carib *yapoule, japali.*
Tooth, *bikiri;* nearly the same as the *kzier* and *yeri* of Caribs.
Heaven, *kaut;* almost identical with the Bakairi *kzau* and Carijona *cahoue,* both Carib dialects.
Legs, *boo'te;* comp. Carib *iebeti, beti.*

I think it is safe to infer from the above comparisons that there is an infusion of Carib elements in the tongue; but the material is too scanty to assign its true value.

According to a count made by the missionaries in 1832 there were about two thousand natives at the mission of Aten, all of whom we may assume were Lecos. Dr. Edwin R. Heath, who spent two years in the valley of the Beni about 1880, does not mention them, at least under this name, and gives no specimen of their language.

In personal appearance the Lecos are described (by Weddell) as of pleasant expression, with straight foreheads and horizontal eyes, the mouth of medium size. In temperament they were frank and cheerful. What is unusual, they seemed totally devoid of appreciation or care for music, and had no dances or songs of any kind.

The alphabet of the vocabulary is the Spanish; *ü* is the French *u; j* as *tscha* in German.

English-Leco Vocabulary.

Arm, *bepel.*
Arrow, *uela.*
Belly, *baùahobo.*
Bird, *katchu.*
Blood, *bile.*
Body, *bonotchco'ro.*
Bow, *tchava'ta.*
Child, *yatchpaik.*
Earth, *lal.*
Eyes, *bisiri.*
Feet, *besel.*
Fingers, *biui.*
Fire, *moa.*
Flower, *tutha.*
Forest, *kanda.*
Hand, *bueù.*
Head, *barua.*
Heaven, *kaut.*
House, *uan.*
Leaf, *uoià.*
Legs, *boo'te.*
Man, *yubasa.*
Milk, *buchuluro.*
Moon, *kurea.*
Mountain, *uotha.*
Mouth, *bokòrua.*

Nails (finger), *biuità*.
No, *nai*.
Nose, *bitchinua*.
Rain, *essa*.
River, *dua* (water).
Salt, *tij*.
Skin, *busutche*.
Sun, *he'no'*.
Teeth, *bikiri*.
Tree, *ba'ta*.
Village, *ue's*.
Water, *dua*.
Woman, *tchusuaya*.
Wood, *hamon*.
Yes, *o-o*.

NUMERALS.

1, *ber*.
2, *toi*.
3, *tchai*.
4, *didai*
5, *ber-tcha*.
10, *ber-bivque*.

V.

A TEXT IN THE MANAO DIALECT.

Two hundred years ago the Manaos occupied an extensive tract near where the Rio Negro empties its dark waters into the Amazon. They were, indeed, the most numerous accolents of the Black river on its lower course, and were estimated at something like ten thousand souls. Their large and shapely canoes and plastered conical dwelling houses bespoke a certain advancement in the arts, and their repute as daring warriors extended far among the Tupi tribes, who adjoined them on the Amazon.

They were not affined in blood or language to the Tupis, but belonged to what is now known as the Arawak or Nu-Arawak (or, as M. Adams prefers to call it, the Maipure) linguistic stock. In the early history of the country, their name is connected with the legend of El Dorado and the land of the Amazons. Later they willingly received religious instruction from the Carmelite missionaries, who gathered them in settlements. But the kidnapping Portuguese carried off many of the converts into slavery, and the remainder fled to the trackless forests, so that half a century ago scarcely a pure-blood representative of the tribe could be seen on the river.

Of their language there are but two specimens known to me; the one, a vocabulary of about 150 words, collected by the traveler,

Dr. Spix, and published in Martius' *Glossaria Linguarum Brasiliensium;* the other, a short catechetical work, which forms the material of this study, and which has never been printed. The original is in the British Museum, Manuscript Department, and bears the title:

"*Doutrina christa'a pella Lingoa dos Manaos.*"

It has long been known to bibliographers, and is referred to by both Ludewig and Von Martius, but no one has copied or published any portion of it. Its authorship and precise date are unknown, but it has the appearance of a draft or copy of an older work, which it would seem was composed in 1740. The orthography of the Portuguese words is somewhat irregular, and there also seems to be an uncertainty in the spelling of various native terms. The extract which I give is about one-half of the whole, and is sufficient to show the character of the tongue.

A comparison of the words of the text with those collected by Spix about a century later shows little change in the dialect, especially when the difference in the method of transcription is allowed for, the writer of the text having employed the phonetics of the Portuguese tongue, while Spix followed that of the German. To illustrate this, and also to facilitate the examination of the text, I append a list of some of the words in the latter, the majority of which are also found in Spix's vocabulary; the latter I have placed in brackets and appended an S.

ENGLISH-MANAO WORDS.

All, *sabaque.*
Always, *lyxaôâri.*
Be, to, *sahi.*
Believe, to, *yaniqui.*
Belly, *tuba* (*tula*, S.).
Body, *cacadÿr* (*katy*, S.)
Day, *samaco* (*tzamâko*, S.).
Die, to, *mɪtica* (*uamatika*, S.).
Earth, *etudeo* (*ete'e*, S.).
Father, *yracary* (*apakony*, S.).
God, *Tupa* (*mauary*, S.).
Heaven, *quinaucudeo* (*ghinauigota*, S.).
Hell, *caman latyma.*
Man, *herenary* (*yrinâly*, S.).
No, not, *mehe* (*me'e*, S.).
Our, us, *öëne* (*huene*, S.).
See, to, *öâbata* (*pipata*, S.).
Sins, *barâyda.*
Son, *bauri, dayri* (*tany*, S.).
Stone, *kÿá* (*ghũa*, S.).
Teach, to, *caÿna.*
Three, *piaduqui* (*pialuky*, S.).
True, *caura.*
Virgin, *sabyra.*
Where? *padeura.*
Why? *capeda.*

Most of these words are derived from roots extending through

many Arawak dialects, and are the property of that stem. Others, however, are borrowed from the Tupi. This is especially so with the word for God, *Tupa*, which is still in use in the Brazilian "Lingoa Geral."

The personal pronouns as given by Spix are:

I, *no.*	We, *huene.*
Thou, *pi.*	You, *yna.*
He, *erouty.*	They, *nela.*

The possessives, however, which are also employed in the conjugations as inseparable prefixes, differ from these. Thus we have:

õê-mequer, our Lord.
oê-naca, like us.
oâ-yaniqui, we believe.
oâ-batar, we shall see.
p'yaniqùi, thou believest.
bɨ-batare, they shall see (him).

Doutrina christa'a pella Lingoa dos Manaos.

P. De q'. sorte se ha de haver o homem neste mundo querendosse livarsse do inferno, e querendo hir ao ceo?

R. Crendo em Deos, fasendosse baptizar, i goardando sua ley.

P. Ha Deos?

R. Ha.

P. Credes em Deos?

R. Cremos.

P. Quem he Deos?

R. O que fez todas as couzas.

P. Com que fez todas essas couzas?

R. Com hua' sua so'palavra.

P. Deos tem corpo como nos?

R. Nam tem.

P. Deos teue antiguamente principio?

R. Nam teve principio.

P. Sempre soy?

R. Sempre.

P. Ha de ser para sempre?

R. Para sempre.

P. Ca peda lyanaqui samaco anaqui çamanna tyma gotia, õâuûÿ-ÿápa que rey lÿüá kynaucuda diche lyoáÿá edaca ũêna?

R. Tupã ÿâquer cayta ca lygara anaquyra.

P. Auûÿnâ ca Tupã?

R. Auûÿnâca.

P. Pyanÿqui Tupã?

R. Oâÿániqui.

P. Capaçay Tupã?

R. Sabaqui bayqui tumaquer.

P. Capâ üÿna pura' Tupã tuma bayquê sabayque?

R. Lygâra üÿnapura.

P. Cacadÿra oênâca Tupã?

R. Mehê cacaliurÿ.

P. Catuquir ha quer rira bauynapu Tupã?

R. Mehê catuquinhaqueri.

P. Lyxaõâri sahir?

R. Lyxaõâri.

P. Bayrichipâ sahi lideuri?

R. Bayriche.

P. Aonde esta Deos?

R. No ceo, e na terra em todo o lugar aonde chamão por elle.

P. Pode o homem ver aqui a Deos?

R. Nam pode ver.

P. Porque?

R. Porque nam tem corpo.

P. Aonde o hemos de ver?

R. No ceo hindo nos la.

P. Eos que sorem ao Inferno nam o hao de ver?

R. Nam o hao de ver.

P. Por que rezam?

R. Em castigo desus culpas.

P. Padeura sahi Deos?

R. Quinancudeo, etedeo sabaqui panoquer deo, padeno oâcaŷta.

P. Sabŷra sahi oâbata caŷdẽo Tupã?

R. Mehe sabi oâbatar.

P. Caŷpeda?

R. Mehe cacasŷr.

P. Padire öâbatar?

R. Guinacuda dixe guareda öâbatar.

P. Bamane camanhatyma diche gareda babatare?

R. Mehe babatare.

P. Capeda?

R. Mehe baŷaligara gata öéneŷninique.

Preguntas sobre a SS. Trinidade.

P. Quantos Deoses ha?

R. Hu sõ Deos verdadero.

P. Sendo pessoas quantas são?

R. Sam tres.

P. Como se chamaṗ essas tres pessoas?

R. Deos Padre, Deos filho, Deos Espirito Santo.

P. Aelle se chama santissima Trinidade?

R. Aelle.

P. Porque rezam?

R. Porque em hu so Deos estam tres pessoas.

P. Esse Deos Padre, Deos Filho, Deos Espirito Santo he o mesmo Deos?

R. He hu so e o mesmo Deos.

P. Em quanto pessoas he a mesma pessoas?

R. Nao: em quanto pessoas Deos Padre he differente, Deos filho he differente, Deos Espiritu santo he differente.

P. Qual dessos pessoas antigam^te

P. Paquiby Tupa?

R. Baúraŷma Tupa caúra.

P. Paquiby lideno paquibŷ.

R. Pyaduqui baduqui.

P. Capacapa mara qui-ŷo piaduqui baduqui-ŷú?

R. Tupan ŷracâry, Tupan bauri, Tupan Espirito Santo.

P. Lysciniqui oena ss. Trind^e macûŷ?

R. Lyxiniqui.

P. Capeda?

R. Baûraŷma Tupa lyanaqui pyaduqui baduqui liûri.

P. Baûrayma liöari Tupa lŷ Tupa yracâry Tupa bayri Tupa Espirito Santo.

R. Baûraŷma Tupa öárŷ,

P. Baûraŷmara sahi lideo baura?

R. Maŷcadi; bauraymarara Tupa yracari, ãŷúnaca Tupa bauri ãúŷnaca, Tupa Espirito Santo ãúŷnaca.

P. Padeuora lypa bauŷnapu lypa

soy prᵉ, Deos Padre soy prᵉ ou Deos filho ou Deos Espirito Santo?

R. Nao soy prᵉ nen hum todos sempre foram.

P. Qual dessos pessoas antiguamᵗᵉ foy a q. se fez homem como nos?

R. O mesmo filho de Deos.

P. Como se chama o filho de Deos depoy de feyto homem?

R. Nosso senhor Jesus Christo.

P. Por isso he, que os Christãos tomaram este nome?

R. Por isso.

P. Que quer dizer Christaos?

R. O que he bapti zado, entre em Jesus Christo filho Deos.

P. Deyxou antigamente N. S. Jesus Christo outra pessoa em suo lugar antez de hir ao ceo?

R. Deyxou s. Pedro e todos os Papᵉs seos successores pᵃ governarem a santa madre Igresia Catolica de Roma assim chamada.

P. Que couza he Santa Madre Igresja Catolica de Roma?

R. Sao todos os que sao baptizados, e estao pela palavra do summo Pontifex Papa de Roma, e agvardao e creem em Jesus Christo.

P. Quem e nosso senhor Jesus Christo?

R. Verdadeyro Deos, e verdadeyro homem, como nos.

P. Como he verdadeyro Deos?

R. Sendo verdadeyro filho de seo Padre.

P. Como e verdadeyro homem.

R. Sendo verdadeyro filho da sempre virgem Maria.

P. Deos filho tem corpo como nos?

R. Tem corpo.

P. Quem fez antigamente o corpo de nosso Senhor Jesus Christo?

Tupa yracary lypa oácaru Tupa bauri oácaru Tupa Espirito Santo?

R. Mehe lyaquyra quariry.

P. Capa bauynâpe qui-yo piaduquy baduqui di lixir; herenari caurâỹ eãnady oënâke?

R. Tupan baỹri.

P. Capaçay Tupa bauyri-y herenari caurarỹ tũminhâne garêde?

R. Oëmequer Jesus Christo.

P. Lỹgâỹqui cãỹta Christaos?

R. Lỹgâỹqui.

P. Capaçây caytâca Christaosly?

R. Tupan bâỹri catỹâca Jesus Christo eỹáquêr.

P. Nemêda dipa baunâpe õémequer Jesus Christo baura õé cuniapâỹ quinaucuda lixyra gereda f gataỹa?

R. Nemêda S. Pedro sabaque Paỹ abarepano mâr Simani caỹdixi santa madre Igreyja catholica mequêr-ey Papa de Roma õácâỹta.

P. Capacay Santa Madre Igª Catholica de Roma?

R. Sabâque caỹtâca Jesus Christo eyaquer ligâra abarepano mar Papa de Roma gara anaguỹra.

P. Capacay õémequêr Jesus Christo?

R. Tupan caura, herenari caura, ãénâca.

P. Capeda Tupa caurâỹri?

R. Tupa ỹrâcari bâyrinỹo.

P. Capeda herenari cauraỹri?

R. Santa Maria ababycagoereỹma dâyri caurayri.

P. Cacadỹra öenaque Tupa dayri?

R. Cacadỹra.

P. Capabaũỹnapû õémequer Jesus Christo carytumaquer?

R. Nen huma pessoa, o fez por graça o por obra do Espirito santo foy feyto.

P. Aonde foy feyto?

R. No ventre de hua donzella chamada Santa Maria.

P. E essa Santa Maria ficou sem lezao assim como otra qualqer virgem que nunca parió?

R. Nem mais nem menos.

P. E depois de parir filou sem lezam?

R. Nao teve lezao ficou sempre virgem.

P. De que sorte se houue N. S. Jesus Christo neste mundo de nascer de sua santissima may?

R. Padeceo fo mecede e canpaço e todos os malles de pena por amor de nos f por nosso amor.

P. Ensinou antigamente N. S. Jesus Christo dando entendimento á gente?

R. Ensinou.

P. Ao depoiz morreo na cruz por nos, em paga de nossos peccados?

R. Morreo.

P. Por amor q.^{em} morreo?

R. Por amor de nos, por amor de nossos peccados, ou satyfuçum delles, p^{a}livarnos do Inferno, e levarnos ao ceo.

P. Por sua vontade?

R. Por sua vontade morreo.

P. Pois elle não hera Deos?

R. Hera Deos.

P. Pois esse morreo?

R. Náo: o corpo q^{e}tomou de sua santissima may he q^{e} morreo.

P. Não havia mos de hir ao ceo, se elle nam morrera?

R. Nao havia mos.

R. Mehe capâtomâr Tupan Espirito santo tuma quenda dêo letuminha f graça tumaquenda dêo letuminha.

P. Padêuora sâhi liâõná?

R. Lÿmâque sabŷra Santa Maria caÿra ababycago erëÿma tubadêo.

P. Lydeu-o Santa Maria enidagareda sabyray ababŷ cagoerëyma mehê runida aguŷra sayro?

R. Lÿaquira õárÿ,

P. Lucâõânîquy pura lûy nidan gaıêda?

R. Mehê rupûta.

P. Capêda õémequer Jesus Christo ÿma samâco anaquŷa lÿracâro gatia lÿnidan gaıêda taÿâpa paÿni garêda?

R. Pöâtŷ ŷbûri metatŷr pe le ly poŷta sabâque bayque pura ly tâ ba ö ã cadŷ che.

P. C aÿna datîr baûÿnapû ö ë mequer Jesus Christo Lita ecatâya nitia herenari ÿchÿ?

R. Recaÿnâda.

P. Guayneýpa remotîca cruza quadia ö ãmâne barâyda õëneÿ?

R. Matîca.

P. Capeda rematîca?

R. Oágâyque ö á m â n e baıâyda õënêÿ camânha tymagaıîa o a u güŷ yâpaquer quÿnâudâ lixira eda câydây.

P. Pananêy?

R. Pananêyra rematica.

P. Mehê saÿhe Tupaly?

R. Tupá.

P. Lydêu-ora Tupã matîca?

R. Mehê; tupã matîca caca rŷra liracâro lyxîra ba çua lyöäri matîcadŷ.

P. Mehê öáma quynaucudâ diche mehe ö á mâtîca garêda?

R. Mehê öáma

P. Quantos dias estenne N. S. Jesus Christo debayxo da terra no teo sepulcro de pedra?

R. Tres dias.

P. Era depois como passou?

R. Resuscitou.

P. Depois de resuscitar como se houve?

R. Subio ao ceo depois de 40 dias.

P. De que sorte se ha, ou esta agourla?

R. Esta asentado à mao direyta de Deos Padre tao honrado e estimado como elle.

P. Paquÿby samâco öemequêr Jesus Christo lideo rimaticâni garêda etê üỹn â pudêo kÿá anaquÿa.

R. Pyaquîbaquî samâco.

P. Guayney padeura?

R. Caydêu-o ocâry.

P. Caydêu-o ocâry guaynèy padêury?

R. Lycuruca iquinaudadire 40 samâco buıûtiquêy.

P. Paquÿpa sahe cachadir lidêury?

R. Tupan yrâcâr sabÿdi libaurây quidêu-o: subinha: aquidi câura ymöèta pyrama.

VI.

THE BONARI DIALECT OF THE CARIB STOCK.

The last of the Bonaris died about 1870. At one time they were a tribe of considerable strength, having their homes in the thick forests along the river Uatumã, which empties into the Amazon from the north, not far below the mouth of the Rio Negro. They were, therefore, neighbors to the Manaos, whose location I have already described.

They were a docile people, and readily collected around the mission Father Nuno Alvarez de Couto established at Sant' Anna do Atumã. There, however, they fell victims to various diseases brought by the whites, and when Canon Francisco Bernardino de Louza visited them, of all the tribe only one old woman survived who was able to give him the words of its speech. These he published in his book, *Para e Amazonas* (three parts, 8vo, Rio Janeiro, 1874–5), which is scarce outside of Brazil, and from which Dr. A. Ernst, of Caracas, obligingly copied for me the vocabulary which I subjoin.

The name of the tribe is taken from the Tupi language or Lingoa Geral of Brazil, and in its proper form *Boa-n-uara* means "snake-men" or "serpent-people." Other *boanari* or snake-men are mentioned, one band on the river Uaupes (Von Martius) and another on the river Içanna (Natterer). It was a term probably derived from the totemic sign, or perhaps from some accidental or fancied peculiarity, and has no ethnic significance.

Even a slight examination proves the Bonari a well-marked Carib dialect, and as such it is correctly assigned and located on Karl von den Steinen's linguistic map inserted in his work, *Durch Central Brasilien*. The only word, however, which he gives from their dialect, *keri*, moon, is not quite correct, according to this vocabulary.

ENGLISH-BONARI VOCABULARY.

Air, *cabu*.
Arrow, *purena'*.
Black, *tapaiuna*.
Bow, *urapa'*.
Brother, *mimien*.
Cold, *tecominhoa'*.
Dance, *timiara*.
Ear, *panare'*.
Earth, *nono*.
Eye, *nuruba'*.
Fire, *uatu*.
Fish, *uutu*.
Girl, *meacaba'*.
God, *tupan*.
Grandfather, *tamunbā*.
Head, *iriopo'*.
Heat, *atupeua'*.
Heaven, *maica-paa*.
House, *abeno'*.
Husband, *unhô*.
Infant, *pitianhea*.
Light, *ataquice*.
Man, *uquere'*.
Moon, *quecê*.
Old, *tapoucu'*.
Old woman, *nafoucu'*.
Rain, *cunoba*.
River, *tuna'* (see *Water*).
Son, child, *meco'*.
String, *ubudiana*.
Sun, *usiu'*.
Thunder, *darara'*.
Tooth, *jorê*.
Uncle, *uemi*.
Water, *tuna*.
White, *tiada'*.
Wife, *upuiten*.
Wind, *iriane'*.
Woman, *uauri*.

The influence of the neighboring Tupi tribes is seen in such words as *tupan*, God; *tamunhā*, grandfather; *urapa'*, arrow (*urapa'ra*, Tupi); *tiada*, white (*ti*, Tupi); *tapaiuna*, black (*tapanhuna*, Tupi), and a few others more faintly. These are loan-words which do not affect the mass of the language.

VII.

THE HONGOTE LANGUAGE AND THE PATAGONIAN DIALECTS.

Among the manuscripts in the British Museum there is one in Spanish (Add. MSS., No. 17,631), which was obtained in 1848 from the Venezuelan explorer, Michelena y Rojas (author of the *Exploracion del America del Sur*, published in 1867). It contains

several anonymous accounts, by different hands, of a voyage (or voyages) to the east coast of Patagonia, "desde Cabo Blanco hasta las Virgines," one of which is dated December, 1789. Neither the name of the ship nor that of the commander appears.

Among the material are two vocabularies of the Tsoneca or Tehuelhet dialect, comprising about sixty words and ten numerals. These correspond closely with the various other lists of terms collected by travelers. At the close of the MS., however, there is a short vocabulary of an entirely different linguistic stock, without name of collector, date or place, unless the last words, "á la Soleta," refer to some locality. Elsewhere the same numerals are given, and a few words, evidently from some dialect more closely akin to the Tsoneca, and the name *Hongote* is applied to the tongue. This may be a corruption of "Choonke," the name which Ramon Lista and other Spanish writers apply to the Tsoneca (Hongote = Chongote = Choonke = Tsōnĕca).

The list which I copy below, however, does not seem closely allied to the Tehuelhet nor to any other tongue with which I have compared it.

The MS. is generally legible, though to a few words I have placed an interrogation mark, indicating that the handwriting was uncertain. The sheet contains the following:

DESCRIPCION DEL INDIO.

Caveza,	*seyocup.*
Frente,	*eyssen.*
Ojos,	*can.*
Orejas,	*coana* (qy. *coaua*)
Narizes,	*bacsen.*
Cejas,	*suman.*
Boca,	*zuzin.*
Dientes,	*idis.*
Pescuezo,	*saislan.*
Brazos,	*cheslan.*
Manos,	*cupa'ches.*
Dedos,	*gadyocoye.*
Barriga,	*coaa'.*
Muslos,	*cava'.*
Pierna,	*cuxin.*
Pie,	*paxasen*
A las conchas,	*chavin* (?).
Cuchillos,	*chavi.*

1,	*pa.*
2,	*sa.*
3,	*chalas.*
4,	*bok.*
5,	*cicchs.*
6,	*tesan.*
7,	*zohs.*
8,	*tachs.*
9,	*teus* (?).
10,	*o'pen.*

No le he podido entender mas.

Canoa,	*tasabay.*
Canalete,	*asaup.*
Toda clase de botones,	*coyocuy.*
Abalorios,	*jamts* (?).

A la Soleta.

The above list I translate and arrange in alphabetical order as follows:

Arms, *cheslan.*
Beads, *jamts* (?).
Belly, *coya'.*
Buttons, *coyocuy.*
Canoe, *tasabay.*
Ears, *coana* (or *coaua*).
Eyebrows, *suman.*
Eyes, *can.*
Fingers, *gaayocoye.*
Foot, *paxasen.*
Forehead, *eyssen.*
Hands, *cupa'ches.*
Head, *seyocup.*
Knives, *chavi.*
Leg, *euxin.*
Mouth, *zuzin.*
Neck, *saislan.*
Nose, *bacsen.*
Paddle, *asaup.*
Teeth, *idis.*
Thighs, *cava.*

The other vocabulary, although it presents the same numerals, differs widely in some of the words. It gives:

Fire, *kanikerk.*
Water, *cuk-hin.*
Sun, *kekar.*
Woman, *becok.*
Eyes, *kavak.*
Ears, *kakuk.*
Mouth, *kakhe.*
Tongue, *kakshlūt.*

These are more closely akin to other Patagonian dialects than the words of the former vocabulary.

It must be acknowledged, however, that we are but poorly supplied with information about the tongues of Patagonia and Tierra del Fuego. In the latter country we have, indeed, sufficient material in the Yahgan, thanks to Brydges, Adam and others; but in

the Onas tongue there is practically nothing and but little of the Alikuluf.

It is still uncertain whether the last mentioned is a branch of the Yakana-cunny, and whether these latter in turn differ from the true Patagonian or Tehuelhet.*

D'Orbigny insists that the Puelches, who have for a century and a half occupied the plains between the Rio Negro and the Rio Colorado (39° to 41° lat. South), are radically different in language both from their Aucanian neighbors to the north and the Patagonian tribes to the south.† For this reason they are called by the Araucanians *Quimnolu-che*, "People who cannot understand."‡ D'Orbigny's short comparative vocabulary of the "Patagon" and "Puelche" certainly reveals a wide difference, but a comparison of the few words of "southern Puelche" collected by Hale discloses unmistakable identities between the two idioms, as:

	S. Puelche.	Tehuel-het.
Star,	*sχalela*,	*tsōkalela*.
Tree,	*apa*,	*opuk*.
Bone,	*ohatsk*,	*ohit*.

Mr. Hale collected his vocabularies at Carmen, on the Rio Negro; and the influence of the northern tribes is distinctly visible in them. Especially the Guachi would seem to have percolated into them. The possessive pronoun of the first person singular, *ia* or *ya*, "my," is seen in both Hale's vocabularies and also in D'Orbigny's Puelche. It is common to the Tsoneca or Tehuelhet and the Guachi.

	Guachi.	Teh. or Puelche.
Nose,	*ia-note*,	*ia-nots*.
Water,	*euak*,	*yagup*.
Mouth *or* lips,	*ia-pé*,	*ia-pelk*.
Teeth,	*ia-va*,	*ia-hai*,
Mountain,	*tegee-loan*,	*atecq, yuilhuana*.

The Poyas or Pey-yus are stated in the *Informe* of General Pietas, above quoted, to have dwelt (in 1729) from the river Lauquen-leufu one hundred leagues southward and quite to the Atlantic. Twenty-five years ago Guinnard found the "Poyu-che," as he calls them, wandering along both banks of the Rio Negro from Pacheco Island

* The writers of the *Mission Scientifique au Cap Horn* identify the Onas with the Yakana-cunny, and assert that they speak a closely related dialect of Patagonian.

† *L'Homme Amèricain*, Tome ii, p. 71.

‡ *Informe* of Don Geronimo Pietas, 1729, quoted by Dr. Darapsky in the *Bull. del Instituto Geographico Argentino*, Tomo x, p. 278.

to the Cordilleras.* The words he gives from their tongue—if they can be depended upon—prove it to be an Araucanian dialect.

Of the Chonos, who were a maritime people on the west coast, we have no linguistic material; nor can we define the relationship of the Calen and Taijatef, who resided on the shore south of 48° and spoke one tongue.

In the following table I present a comparison of a limited number of common words in Patagonian vocabularies, beginning with the earliest—that collected by Magellan on his first visit to the straits that bear his name, in 1520. It is interesting to note how little the language has changed in the nearly four centuries which have passed since that period. The list is found in Pigafetta's narration.

Dialect.	Author.	Man.	Woman.	Sun.	Moon.
1. Patagonian,	Pigafetta,			*calexchem,*	
2. "	MS. Br. Mus. I.	*nuken,*	*ache,*	*kora,*	*amania,*
3. "	MS. Br. Mus. II,	*nuken,*	*zunum,*	*kokaua,*	*amania,*
4. "	Martius,	*nuken,*	*zunum,*	*shuim,*	*amania,*
5. "	D'Orbigny,	*nuca,*	*nacuna,*	*chuina,*	*chuina,*
6. Tsoneca,	Hale,	*kina,*	*iamo-kanika,*	*apiuχk,*	
7. Choonke or Tehuelche, or	Musters,	*ahonican,*	*karken,*	*gengenko,*	*showan,*
8. Tehuelhet,	Lista,			*kenguenkin,*	*shegueuon,*
9. Puelche,	Hale,	*kine,*	*iamo-kanok,*	*tçiaχatoka,*	*apiχok,*
10. "	D'Orbigny,	*chia,*	*iam-kat,*	*apiucuc,*	*pioo,*
11. Hongote,	MS. Br. Mus I.				
12. "	MS. Br. Mus. II,		*becok,*	*kekar,*	
13. Tekennika (or Yahgan),	Brydges,	*won,*	*kepa,*	*lum,*	*hannuka,*
14. Alikuluf,		*ackinish.*	*ackhanash.*	*lum.*	*cuunequa.*

Dialect.	Author.	Fire.	Water.	Head.	Eye.	Ear.
1. Patagonian,	Pigafetta,	*gialeme,*	*holi,*	*her,*	*oter,*	*sanè,*
2. "	MS. Br. Mus. I,		*jarra,*	*guil,*	*gosel,*	*jenè,*
3. "	MS. Br. Mus. II,	*hamonaka,*	*karra,*	*guial,*	*gotel,*	*shenè,*
4. "	Martius,	*hamonaka,*	*karra,*	*guil,*	*gottel,*	*shenè,*
5. "	D'Orbigny,	*maja,*	*ara,*	*dil,*	*guter,*	*jenè,*
6. Tsoneca,	Hale,	*hauakok,*	*iagup,*	*iagoha,*	*iatelk,*	
7. Choonke or Tehuelche, or	Musters,	*yaik,*	*lèy,*	*kittar,*	*öll,*	
8. Tehuelhet,	Lista,	*yeike,*	*lehe,*		*otel,*	*shaa,*
9. Puelche,	Hale,	*auiχok,*	*iagop,*	*ia'oe,*	*iatcteke,*	*iatsosk,*
10. "	D'Orbigny,	*aquacake,*	*iagup,*	*iacaa,*	*iatilco,*	*iaxyexke,*
11. Hongote,	MS. Br. Mus. I,			*seyocup,*	*can,*	*coana,*
12. "	MS. Br. Mus. II,	*kauikok,*	*kukhin,*		*kavak,*	*kakuk,*
13. Tekennika (or Yahgan),	Brydges,	*pushaky,*	*shamea,*	*lukabe,*	*della,*	*ufkhea,*
14. Alikuluf.		*tëtvi.*	*chanash.*	*of'chocka.*	*telkh.*	*teldil.*

*A. Guinnard, *Three Years among the Patagonians*, p. 49 *et al.* (Eng. trans., London, 1871). The prayer he inserts in some dialect not clearly stated on p. 163 is almost pure Araucanian, as are the numerals on p. 261. It is doubtful if he was ever among the true Patagonians (the Tehuelhet).

Dialect.	Author.	Mouth.	Nose.	Tongue.	Tooth.
1. Patagonian,	Pigafetta,	*chian,*	*or,*	*scial,*	*for,*
2. "	MS. Br. Mus. I.			*deol,*	*for, kor,*
3. "	MS. Br. Mus. II,		*ó,*	*del,*	*kurr,*
4. "	Martius,		*oo,*	*dal,*	*curr,*
5. "	D'Orbigny,	*ihum,*	*ho,*		*jor,*
6. Tsoneca,	Hale,	*tapulk,*	*tanots,*		*iaχ∝ia,*
7. Choonke or Tehuelche, or	Musters,		*tchal,*	*tal,*	*oër,*
8. Tehuelhet,	Lista,	*shahan,*	*or,*		*orre,*
9. Puelche,	Hale,	*tapolk,*	*tanit,*	*tawonōk,*	*ta haí,*
10. "	D'Orbigny,				
11. Hongote,	MS. Br. Mus. I.	*zuzin,*	*bacsen,*		*idis,*
12. "	MS Br. Mus. II,	*kakhe,*		*kakshlut,*	
13. Tekennika (or Yahgan),	Brydges,	*yeak,*	*cushush,*	*lān,*	*tu'un,*
14. Alikuluf.		*uffeare.*	*nohl.*	*luckin.*	*cauwash.*

Dialect.	Author.	Hand.	Foot.	House.	One.
1. Patagonian,	Pigafetta,	*chéné* (*cori,* fingers),			
2. "	MS. Br. Mus. I.	*jan,*	*kel,*	*cocha,*	*jauken,*
3. "	MS. Br. Mus. II,	*ore,*	*kel.*	*cocha,*	*cheuken,*
4. "	Martius,	*ore, fan,*	*keal,*	*cocha,*	*cheuquen,*
5. "	D'Orbigny,	*chémé,*	*ti,*		
6. Tsoneca,	Hale,				*tçie,*
7. Choonke or Tehuelche, or	Musters,	*tsicc'r,*	*shankence,*	*kou,*	*chuche,*
8. Tehuelhet,	Lista,		*alj,*		*choché,*
9. Puelche,	Hale,	*ia sk'vp,*	*tapgit,*	*ahoike,*	*tçi,*
10. "	D'Orbigny,	*ia paye,*			
11. Hongote,	MS. Br. Mus. I.	*cupaches,*	*pasasen,*		*pa,*
12. "	MS. Br. Mus. II,				*pa,*
13. Tekennika (or Yahgan),	Brydges,	*jösch,*	*cōcca,*	*ukkral,*	*ocoale,*
14. Alikuluf.		*yuccaba.*	*cutliculcul,*	*hät.*	*towquidow.*

Dialect.	Author.	Two.	Three.	Four.	Five.
1. Patagonian,	Pigafetta.				
2. "	MS. Br. Mus. I		*kear.*	*kekague,*	*kaszen,*
3. "	MS. Br. Mus. II,	*keukay,*	*keash,*	*kekagui,*	*keitzun,*
4. "	Martius,	*zeukay,*	*keash,*	*kekaguy,*	*kegtzun,*
5. "	D'Orbigny,				
6. Tsoneca,	Hale,	*pōetçi,*	*gotsk,*	*mala,*	*tanka,*
7. Choonke or Tehuelche, or	Musters,	*houke,*	*aās,*	*carge,*	*ktsin,*
8. Tehuelhet,	Lista,	*jauke,*	*kaash,*	*kague,*	*tzen.*
9. Puelche,	Hale,	*pe tçi,*	*gōt,*	*mala,*	*tanke,*
10. "	D'Orbigny,				
11. Hongote,	MS. Br. Mus. I.	*sa,*	*chalas,*	*bok,*	*ciechs,*
12. "	MS. Br. Mus. II,	*sa,*	*chalas,*	*bot,*	*ciech,*
13. Tekennika (or Yahgan),	Brydges,	*combabe,*	*mutta.*	*carga,*	*cup'aspa.*
14. Alikuluf.		*telkeow.*	*cup'eb.*	*inadaba.*	

Notes on the Vocabulary.

Man.—The root in all the allied Tsoneca dialects is *ken, kin* or *kan,* which is the generic term for the species *homo.* It is seen

with a feminine prefix in *iamo-kan-ok*, *kārken*, *ackhanash* (=*wa-kan-ash*). The English form of this root becomes *cunny*, found as a suffix to various tribal names.

Woman.—*Zunum* = woman, as *zunum nakon*, ugly woman; *zunum kekalun*, girl, young woman; *iama* or *yama* means properly "mother;" *ache* or *ysher* (Musters) is a woman of the same gens, the masculine form of which is *chen*, brother; *karken* is a married woman.

Sun and Moon.—The two prevailing roots are *kar* and *shuin*. They both appear in Pigafetta's *calexchem* (=*kare-shuin*). The vocabulary No. 2 translates *kora* as "sun, heaven, God." The generic term for both orbs is *shuin* (*chuina*), which seems allied to the Araucanian *cuyen* of the same meaning. The Hongote *ke-kar* shows the radical *kar*. Another radical for both orbs is the guttural sound variously represented by *kok*, *cuc*, *χok*, *keng*, *geng*, *sheg*. According to Brydges the Yahgans have two different words for sun, *lum* and *usteca*, and two for moon, *annuca* and *hunian*.

Fire.—The radical sound appears to be *'auaχ*, spelled variously *yaik*, *hauak*, *kauik*, etc. The first syllable is visible in *maja* = *ma-yaχ*.

Water.—The term *jarra* or *karra* means "drinking water," from *jara*, to drink; *iagop* is rain water (*ciagop*, rain, Hale); the *lēy* and *lehe* of Musters and Lista appear to be an abbreviation of the *ho-li'* of Pigafetta.

Head.—Pigafetta's *her* = *hel*, which is a variant of *guil*, *dil*, etc. Another radical for the idea is a guttural, *'χa*, which is at the base of *ia'oe*, the Hongote *se-yocup*, Yahgan *luka-be*, etc. (comp. Araucanian *lonco*, head).

Eye.—All the words are clearly related except the Hongote.

Ear.—The term given by Pigafetta, *sané*, is repeated with slight variation in the various dialects including the Hongote, except the Puelche, where Hale and D'Orbigny give a different word. The verb *choinqué*, to hear, seems related to *shené*, ear.

Mouth.—Wide discrepancies appear in the terms for this organ. The words *chian*, *shahan* and *ihum* are probably forms of *shum*, which is the right word for mouth, while *ia pelk*, according to Hale, means "my lips."

Nose.—The general root is a modification of *ō*, Lista's *or* = *ob*, which reappears in *tochal*, *nōhl*, etc.

Tongue.—Pigafetta's *scial* reappears in Muster's *tal*, etc.

PROC. AMER. PHILOS. SOC. XXX. 137. L. PRINTED MARCH 18, 1892.

Tooth.—The prevailing radical *or* may be related to Araucanian *or*, bone.

Hand.—Two conceptions are conveyed by the words presented, *ché'mé, ché'né, jan, fan*, all forms of the same = upper extremity, arm and hand; while *or, cori, tsic-c'r, ya-s'k'cup* all refer to the fingers.

Foot.—The general root *kel* probably reappears in *'alj*, and even in *shan-kence* (= *chen-kels*, lower extremity), *cutli-kulkul*, etc.

House.—The root is generally *ko'a*.

Numerals.—These display considerable diversity. Several are merely borrowed from the Araucanian, in which we have: 1, *quiñe;* 2, *epu;* 3, *cula;* 4, *meli;* 5, *kechu*. From *kechu*, for instance, comes Hongote *ciech*, Tel. *keitzun, tzen*, etc. Hong. *chalas* probably = Tel. *ka-ash;* Hong. *sa* = Tel. *tçi*, etc.

The general conclusion to which these comparisons lead is that the Patagonian dialects are probably more closely related than has hitherto been assumed.

VIII.

THE DIALECTS AND AFFINITIES OF THE KECHUA LANGUAGE.

At the time of the discovery, and probably long before that date, the Kechua language was spoken along and near the Pacific coast from 3° North to 35° South latitude, that is from the Rio Ancasmayu in Ecuador to the Rio Maule in Chili.

Of course, in this long extent of nearly twenty-five hundred miles of mountains and deserts, there was considerable variety in its dialects; but, so far as I can learn, much less than might be expected at first sight. The Abbé Camaño, a learned Jesuit who traveled extensively in Peru about the middle of the last century, and whose *Elementi della Lingua Quichua* has never seen the light in print, classified the tongue under five dialects as follows:

1. The Chinchasuyo, spoken in the diocese of Lima.
2. The Lamaño, spoken about Lamas, in the diocese of Truxillo.
3. The Quiteño, current in and around the city of Quito.
4. The Calchaqui or Tucumaño or Catamareño, which prevailed west of the Cordillera in the province of Tucuman.
5. The Cuzcuaño, in and around Cuzco.

Of these the last mentioned is that which is considered the

classical, and was adopted by the missionaries as representing the language in its purest and most ancient form. In it the drama of *Ollanta* was composed, which is justly regarded as one of the finest productions of American aboriginal literature.

The identification of the Calchaqui dialect of Tucuman with a patois of the Kechua would settle a vexed question in American ethnography and archæology. The language and the nation of the Calchaquis have long since disappeared; but their material relics, in the shape of well-constructed walls of dressed stones, tombs of the same material, ornaments and images in copper and gold, and handsomely decorated jars of earthenware, still remain in sufficient abundance to testify to a condition of culture among them rivaling that of the Kechuas of the western slope of the Cordilleras.*

The learned traveler, Von Tschudi, imagined that their tongue was the modern Atacameño, and that these sparse inhabitants of the desert were descendants of refugee Calchaquis.† But there is no actual evidence to this effect.

Florentine Ameghino, who has done so much for our knowledge of the Argentine Republic, claims the Calchaqui as a dialect of the Aymara tongue of Bolivia;‡ and the two latest writers on the subject, S. A. Lafone Quevedo and Dr. H. von Ihering, are equally at issue in their opinions. The latter insists that the Calchaquis spoke an idiom wholly different from either Kechua or Aymara;§ while the former argues that this extinct tongue was "not exactly Kechuan, but not altogether distinct" from it, and was a mongrel dialect made up of Kechuan, Abiponian and Guaranian elements.‖

When we turn to the old authorities the point is by no means cleared up. The first and best who states anything definite is the Jesuit missionary, Alonso de Bárzana (sometimes written Barcena), whose letter from "Asuncion del Paraguay," dated September 8, 1594, gives some pertinent particulars. He writes: "The most widely extended languages (in Tucuman) are the Caca, the Tonocote and the Sanavirona. The Caca is spoken by the Diaguitas and throughout the valley of Calchaqui, and that of Catamarca, and in most of the district of Nueva Rioja. Nearly all the towns

* See authorities quoted in my work, *The American Race*, pp. 319 *seq.*

† *Reisen in Süd-Amerika*, Vol. v, p. 81; *Organismus der Khetsua-Sprache*, p. 71.

‡ Ameghino, quoted by Ihering.

§ In *Das Ausland*, 1891, p. 944.

‖ "Notes in the Calchaqui Region," in the *American Anthropologist*, October, 1891, p. 358.

about Santiago use it, as well as the natives along the Rio de Estero, and many more who live in the mountains. I have prepared a grammar and vocabulary of this language."*

These statements assign a distribution of the language over an area about 450 miles from east to west, and 300 miles from north to south. It is highly unlikely that so widespread a tongue should utterly disappear while so many of the descendants of those who spoke it still survive. Yet the native population of Tucuman today speak only a corrupt Kechua dialect, when not Spanish. In fact, the name applied to the tongue by Bárzana, *kaka*, is the Kechua word for mountain, and signifies in this connection the dialect of the mountaineers.

The grammar and vocabulary he prepared are lost, and we have no monuments of the language remaining, except the geographical and other names mentioned in the early writers or preserved on old maps. In examining these one is at once struck with the numerous names of villages ending in *-gasta*. These are found from the Rio Salado to the Cordillera, and from about 26° 30′ to 31° 30′ South latitude; in other words, in just about the area assigned by Bárzana to the Caca tongue.

I quote some of them:

Ambargasta,	Guanagasta,
Amingasta,	Machigasta,
Auguagasta,	Paquilagasta,
Cahgasta,	Tinogasta,
Calingasta,	Tuquiligasta.
Chiquiligasta,	

I do not think there can be any doubt but that this *gasta* is a corrupted form of the Kechua *llacta*, town or village. In pure Kechua there is no *g* sound, and the *c* is a guttural (German *ch*); so that a rough equivalent in the Spanish alphabet would be close to *gasta*. Moreover, many of the syllables preceding the termination are evidently Kechua, as:

Cahgasta = *caja llacta*, cold town; an appropriate name, as it lies high up the Cordillera on the Rio de Limari.
Auguagasta = *aucca llacta*, enemies' town; occupied by hostile people.
Calingasta = *ccali llacta*, healthy town; probably from its salubrious site.

* Bárzana's letter is printed in the *Relaciones Geográficas de Indias, Peru*, Tomo ii (Madrid, 1885).

Machigasta = *macchiy llacta*, washing town, place where large solid things are washed; quite suitable to the village of the name on the eastern end of Lake Andalgala.

The Kechua origin of these names is plain. But if the Caca or Catamareño, as it is sometimes called, was merely a dialect of the Kechua, why did Bárzana speak of it as a separate tongue? Possibly because the differences in sound were so great as to render it unintelligible to a person familiar only with the dialect of Cuzco.

For the present the evidence seems sufficient to consider the Calchaquis a more or less mixed branch of the Kechua family, and the supposition formerly advanced by myself and others that they constituted an independent stock seems unwarranted.

The Quiteño dialect was held by Von Tschudi to present features of higher antiquity than that of Cuzco. So far as I know, there are few published specimens of it.*

The Chinchasuyu or Chinchaya dialect, also one of the northern branches of the tongue, has been sufficiently analyzed by Von Tschudi in his work on the language, his materials being drawn from the Appendix to the second and third editions of Diego de Torres Rubio's *Arte de la lengua Quechua*, and from the manuscripts of the German engineer, Hermann Göhring.† He finds the pronunciation softer. Certain differences in the verbs appear, in part, to be neologisms. And there is a rather large number of words which are wholly diverse in the two dialects.

The Lamaño is said by Von Tschudi to be closely allied to the Quiteño, but he acknowledges that he was not personally familiar with it.

Whether the Incas, that is, the gens from whom the war and peace chiefs were selected, had a language or dialect peculiar to themselves, as asserted by Garcilasso de la Vega—and by nobody else—has been again brought up for discussion lately by Dr. E. W. Middendorf. He maintains that they had, and that this secret language was the Aymara.‡ This he does in the face of the fact that every one of the eleven words which Garcilasso quotes from this mysterious tongue turns out either to be pure Kechua or from a

* An *Arte*, printed at Lima in 1753, of this dialect, is mentioned by Ludewig, *Lit. of Amer. Aborig. Langs.*, p. 162.

† *Organismus der Ketchua Sprache*, Einleitung, p. 65.

‡ See the Introduction to his work, *Das Runa Simi oder der Keshua-Sprache* (Leipzig, 1890).

Kechua radical.* Dr. Middendorf holds his opinion not so much on the evidence, as to support his favorite theory that the Kechua civilization was derived from the Aymaras and that the Inca gens was of Aymara descent. Unfortunately, he has not acquainted himself with the real constitution of the Kechua social system. It has been ably and satisfactorily analyzed by Dr. Gustav Brühl † and later by Heinrich Cunow.‡

The precise relationship of the Aymara language to the Kechua has received considerable further elucidation through Dr. Middendorf's recent studies. He supplies a list of about five hundred and seventy words, which have approximately the same form and sense in the two tongues, and a second list of about one hundred words which are alike in form but with more or less variation in sense. There is also a strong phonetic likeness between the tongues, and their grammatical characteristics approach each other. His conclusion is that "Aymara and Kechua are sister languages, but are like children of mixed marriages; for while they agree in their essential nature (in ihrem Wesen) quite to the most trivial peculiarities, yet in external grammatical form, as well as in the larger part of their vocabulary, they are wholly asunder." §

This is substantially the conclusion reached by that master of linguistic science, Prof. H. Steinthal, who has ably explained the identities and diversities of these two tongues on principles of the general philosophy of language.‖

It is probable that further light would be thrown on this question, so interesting for the information its settlement would yield on the origin of Peruvian civilization and the archæology of the region around Lake Titicaca, were the comparison instituted between the oldest, and therefore purest, forms of the two tongues; and it is partly to call attention to some rare or unpublished materials suitable for this purpose that I have introduced the subject.

* Von Tschudi, *Organismus der Khetsua-Sprache*, Einleitung, s. 65. Wilhelm von Humboldt was the first to identify the words adduced by Garcilasso as members of the Kechua.

† Gustav Brühl, *Die Culturvölker Alt-Amerikas* (Cincinnati, 1887).

‡ "Das peruanische Verwandtschaftssystem und die Geschlechtsverbände der Inka," in *Das Ausland*, 1891. As to the "secret language," Cunow says, after discussing what words of it we find in Garcilasso—"Man sieht, von einer Geheimsprache kann keine Rede sein."

§ See Dr. E. W. Middendorf, *Die Aimará-Sprache*, s. 285, *seq.* (Leipzig, 1891), and *Das Runa Simi oder der Keshua-Sprache*, s. 25 (Leipzig, 1890).

‖ "Das Verhältniss zwischen dem Ketschua und Aimará," in the *Compte Rendu* of the Congrés des Américanistes, 7ème Session (1888), p. 465.

Assuming with most Kechuists that the trend of migration was from north to south, we should look towards the north for the oldest forms of the tongue. This, as I have said, Von Tschudi did; but both he and Dr. Middendorf state that they had not seen the work on the Quiteño dialect printed at Lima in 1753, nor apparently any MS. on the structure of the northernmost branches of the tongue.

A vocabulary is mentioned by Von Tschudi, dated in 1814, which gives words of the idiom as spoken in the dioceses of Maynas and Ucayali.

This could be supplemented by a later MS. in my library, containing a *Diccionario castellano-inga* (*y inga-castellano*) *segun se habla en las montañas limitrofes del Ucayali* and a *Gramatica del idioma Inga acomodado al modo de hablar de los manoitas y Maynas*. It is dated 1868, and the author is given as Fr. Mariano Castellanzuelo; but it appears, in part at least, to be founded on some earlier work.

A comparison of this MS. with the grammars of Von Tschudi and Middendorf shows that the dialect of Maynas, the most eastern of all the Kechua dialects, is more closely akin to the Cuzceño than to the Quiteño, both in vocabulary and structure. It does not present the terminal *nga* to the verbal stem, common in the latter. In vocabulary it is nearer the classical Kechua than to the Chinchaya; for example:

	Maynas.	Kechua of Cuzco.	Chinchaya.
Town,	*llacta,*	*llacta,*	*marca.*
Head,	*uma,*	*uma,*	*peka.*
Water,	*yacu,*	*unu,*	*yacu.*
Small,	*uchuccla,*	*huchuccla,*	*ikchiccla.*
Cold,	*chire,*	*chiri,*	*cahcha.*

For the Aymara, the comparison should be made with its purest form. This was confessedly the Pacasa dialect and not the Lupaca, in which the *Arte* and *Diccionario* of Bertonio were composed. At present, although the distinction between the dialects has been in a measure erased by the facilities of modern intercourse, there remain extensive variations both in grammar and vocabulary.* The excellent work of Dr. Middendorf is founded on what purports to be the Pacasa; and in the Brown Library, at Providence, there is a modern folio MS. by D. B. de Merian, entitled *Historia D. N.*

* Dr. E. W. Middendorf, *Die Aymará-Sprache*, Einleitung (Leipzig, 1891).

J. C. in Linguâ Pacasâ. It contains the original and an interlinear translation in Latin. I quote the following passage as an example:

TEXT IN THE PACASA DIALECT OF THE AYMARA LANGUAGE.

Ancha hacha llaquisiñapana kerisiñapa vila humppiñapsa
Summæ afflictionis suæ agone suo, sanguineo sudore suoque finito
tacutatha collna Jesusa cinti carcta uraquetha
divinus Jesus valdé fatigatus de terra surgens,
sartussina yatichatanacparu cutinira.
ad discipulos suos rediit. Verum eos valdé dormientes
Maasca acanaca conti iquisquiri hacjatassina parajtayana
deprehendens, eos excitavit, dicens: "Surgite! Jam enim venit
sassina sartupjama niupilla puri aljirihaja
venditor meus: quomodo vos dormitis? non videtis
lamisaraqui humana cuja iquisipjiquita hanati
quomodo inimicus meus non dormit, sed Judæorum in manus
ulljapjta, camisa aucahaja hanikua iquiti,
suas ad tradendum me jam adest?" Verum, divine Jesus,
maasca Judiona cana amparanacparu catuyaña hattaqui
non solum de discipulis tuis conquerere, de hujus urbis incolis
niahua piori? Maasca collana Jesusay haniqui
etiam conquerere, qui in omnibus et singulis animas
yatichatanamatha quejasirati aca marca haquenacatha.
suas salvandi rebus semper dormitant, semper otiosi sunt.

(From the *Historia D. N. J. C. in Linguâ Pacasâ, diocesis urbis de la Paz. Descripsit D. B. de Merian.* MS. folio.)

IX.

AFFINITIES OF SOUTH AND NORTH AMERICAN LANGUAGES.

The first scientific attempt to show a connection between South and North American languages was that read by Dr. Max Uhle before the Congrés des Américanistes at Berlin in 1888, and published in the *Compte Rendu* of that association. It was confined to demonstrating a relationship between the Chibcha dialects of northwestern South America to the Costa Rican dialects, which have been so fruitfully studied by Gabb and Thiel.*

* I have summarized the evidence in *The American Race*, pp. 184–186. I do not overlook the Rev. William Herzog's article in the *Archiv für Anthrop.*, 1884, entitled, "Ueber die Verwandtschaftsbeziehungen der costaricensischen Indianer-Sprachen mit denen von Central- und Süd-Amerika;" but it does not take up the subject in a scientific manner, and hence its results are unsatisfying.

Still more recently an effort has been made by Dr. A. Ernst, of Caracas, to establish a linguistic connection between the dialects of the Timote stock, who occupy the Cordillera in the district of Mérida (8° N. lat.), and the Costa Rican dialects, thus bringing the Timotes into the Chibcha stock, as he expressly claims. He goes yet further and seeks to discover verbal identities between the Timote and the Guatusó, spoken in Nicaragua on the Rio Frio. The latter is not supposed to be related to the Costa Rican dialects, which makes Dr. Ernst's theory the more important could it be substantiated. He has published a list of forty-five words in an article in the *Boletin del Ministerio de Obras Públicas* for April 8, 1891 (Caracas, Venezuela), on which he bases his claim. I translate and arrange these words, and shall examine the alleged analogies.

SUPPOSED AFFINITIES BETWEEN TIMOTE, COSTA RICAN AND GUATUSO WORDS.

	TIMOTE STOCK.	COSTA RICAN STOCK.	GUATUSO.
Man,	*caac,*	*caga, caca* (father).	
Woman,	*cursum,*	*ra cur,*	*curiza* (female).
Wife,	*carigura,*		*curijuri* (woman).
Mother,	*shugúe,*		*shu.*
Man, white,	*ticep,*	*suát,*	*otshapa* (señor).
Woman, white,	*ticiura,*	*soóra.*	
Child,	*timúa,*	*istamura* (little).	
Boy,	*sari,*	*hara, tshaasoroj,*	*araptshaura.*
Brother,	*cushis,*	*ayi, tshi.*	
Head,	*kitsham,*	*kotshen* (a point).	
Mouth,	*macabó,*		*macokica.*
Tongue,	*shikivú,*	*kerkuo.*	
Foot,	*cujú,*	*bukurú.*	
Fire,	*shirup,*	*yuc, iyuc, tshicra.*	
Water,	*shimpue,*	*divua* (a torrent).	
Stone,	*tituup,*	*i-úhu-wah,*	*capi* (hard).
Wood,	*tisep,*	*dshi-shiba.*	
Salt,	*shapi,*	*tsheba* (pepper).	
Meat,	*shoroc,*	*susturic* (deer).	
Flesh,			
Skin,	*mishu,*		*maiza.*
Animal,	*ticagüai,*	*oguá.*	
Dog,	*tisirki,*	*shiti.*	
Snake,	*sui,*	*shuah.*	
Flea,	*ikis,*	*shiike.*	

	Timote Stock.	Costa Rican Stock.	Guatuso.
Scorpion,	*ikiyut,*	*ikŭh.*	
Hawk,	*kué,*		*zuĕ.*
Egg,	*shicapo,*	*cup, icup.*	
Pepper,	*sicas,*	*shiboh, tsheba.*	
Maize,	*shippyac,*	*cupac* (cornfield).	
Bread,	*suridipa,*	*ip* (maize).	
Town,	*musipue,*	*coc* (place), *susi* (to dwell), *nicona puca* (to live).	
Night,	*kisi,*	*shki.*	
Thief,	*shisnugui,*	*nruoëh.*	
Morning,	*sik,*	*scék.*	
When,	*pena,*		*ping.*
Sweet,	*shiboh,*	*búuk.*	
To go,	*guateque,*	*ta toeh* (I go).	
It rains,	*oki moi,*	*tshoki.*	
One,	*cari,*	*krará.*	
Two,	*ca-bó,*	*buúk.*	

On looking over this list it is obvious that the Guatuso affinities are too slight to justify the assumption of a relationship. The syllable *cur* in the words for woman, and *shu* for mother, are the only elements that offer a real similarity, and this is too scanty a supply to work on.

In the Costa Rican analogies the sense is often too remote. It is scarcely fair to consider "father" and "man" as identical ideas; or "child" and "little;" "head" and "point;" "meat" and "deer;" "salt" and "pepper;" "maize" and "cornfield," etc. Selecting words so asunder in meaning and choosing, from several dialects on both sides, apparent analogies can always be found. Other words present, in fact, no resemblance, as *suát* to *ticep*, *divua* to *shimpue*, *i-uhu-wah* to *tituup*, etc. There remain a few actual similarities which may be linguistic identities; but these should probably be explained by the fact that the Timote tribes lived near those of Chibcha lineage, and doubtless borrowed from them a number of terms. Such loan words are found in the tongues of all nations who reside in close proximity for a few generations.

I conclude, therefore, that the Timote must still be regarded as an independent stock, and its connection with any in North America has not yet been demonstrated.

On crossing the mountain chain which separates Costa Rica

from Nicaragua, we enter a territory which was at the discovery occupied by nations whose traditions and linguistic affinities pointed to the higher latitudes of North America. Such was the Nahuatl tribe, who occupied the islands and southern shores of Lake Nicaragua, and the Mangues, who peopled the borders of Lake Managua.

The latter were closely related to the Chapanecs of Chiapas, speaking the same tongue with slight dialectic variations. One band of the Mangues, about four hundred in number, was found by the early explorers among the Guaymis, one of the Costa Rican tribes whose language has marked affinities to the Chibcha idioms of New Granada. The close relations thus established between the two stocks reappear in the Mazatec language, spoken in the district of Teutitlan del Camino, State of Oaxaca.

Availing myself of a MS. vocabulary of this language, furnished me by M. A. Pinart, I have shown that it is essentially a Chapanecan dialect, but with a strong infusion of Costa Rican, and especially Guaymi, elements, and presents the most northern example of the influence of South American upon North American languages.* The following examples will illustrate the similarity:

	Mazatec.	Costa Rican.
Sun,	*sui,*	*chui* or *sua.*
Moon,	*sa,*	*só, sie* (or *za*).
Ear,	*schical,*	*quhyca, schuke.*
Eye,	*schcu,*	*s'ócvo, ócua.*
Hair,	*coshé,*	*schá, quyhé.*
Man,	*chi,*	*he-chi-che.*
Woman,	*chu,*	*sue, gũi.*
Rain,	*tzi,*	*siu.*
Sea,	*dachicu,*	*dechequ-in.*
Foot,	*tzoco,*	*tsuku.*
Head,	*tku,*	*θokua.*
Nose,	*nito,*	*nido-ñ.*

The Mazatecs were a people of considerable culture, celebrated for their religious fervor, and for the important temples and sanctuaries established in their country, prominent remains of which still exist.

* See a paper by me in the *Proceedings* of the American Philosophical Society, January, 1892, entitled "The Mazatec Language and its Affinities."

X.

ON THE DIALECTS OF THE BETOYAS AND TUCANOS.

The most recent writer on the Tucanos of the Rio Negro and Upper Amazon, Dr. Franz Pfaff, observes: "Ueber die Stammesverwandtschaft der Tucanos kann mit einiger Sicherheit nichts behauptet werden."* Von Martius believed them a horde of the Tapuya (Gēs, Botocudo) stock;† but their language betrays no such relationship except in a few, doubtless borrowed, words. They are equally far from the great Tupi, Arawack and Carib stocks. But I believe I can show by conclusive evidence that this hitherto unidentified people speak a language akin to that of the Betoyas and Tamas, whose home is located on the eastern slope of the Cordillera, between the head waters of the rivers Apure and Meta.

My further studies of the Betoya dialects have resulted in discovering for them a much wider extension than I assigned in *The American Race*. They can be traced through about ten degrees of latitude (from 3° South latitude northeastward to 7° North latitude) in a large number of tribes resident on the rivers Napo, Putumayo, Caqueta, Uaupes, Negro, Meta and Apure. The affinities of many of these tribes are asserted by the early missionaries, whose testimony on such points was based on a study of the languages. One of the most useful of these sources is the *Noticias Autenticas del Famoso Rio Marañon*, composed by an anonymous Jesuit missionary, and recently published for the first time under the competent editorship of Jimenez de la Espada by the Geographical Society of Madrid.

Another Jesuit, Father Padilla, in a letter to the Abbé Hervas, stated from personal knowledge that the *Siraras*, *Eles*, *Airicos* and *Situjas* all speak dialects of Betoya; while Gumilla names as other dialects the *Luculia*, *Jabua*, *Arauca* (probably for *Airica*), *Quilifay*, *Anabali*, *Lalaca* and *Atabaca*.

The town *Betoye* itself is situated on a small affluent of the Casanare, in 6° North latitude, at the foot of the mountain chain known as the "Paramo de Chisga," inhabited by a wild tribe of unknown affinities, the *Chitareros*.

The anonymous writer already referred to states that in 1730 the Jesuits had seven "reductions" among the Icaguates (Piojes) of

* *Verhandlungen der Berliner Gesell. für Anthrop.*, etc., 1890, s. 603.
† *Glossaria Linguarum Brasiliensium*, p. 283.

the Napo, and their missions extended north to the banks of the Putumayo, on which stream were the *Amaguages* and the *Ocoguages*. Below the latter, and occupying most of the district between the middle Putumayo on the north and the lower Napo and Amazon on the south, were a number of tribes collectively called *Zeonas* (*Seones*), comprising the *Cungies*, *Parianas*, *Cenceguages* and others. These spoke a tongue allied to that of the Icahuates (Piojes); while "the *Neguas*, *Seizos*, *Tamas*, *Acunejos* and *Atuaras* are all of one tongue." The editor, Jimenez de la Espada, speaking from personal knowledge gained on the spot, identifies the modern Piojes with the *Encabellados* of the Spanish writers and the *Icaguates* of the Jesuits.

It is greatly to be regretted that the ample material existing in manuscript for the study of the Zeona language has not been made accessible. Col. Joaquin Acosta had in his library a *Diccionario y Doctrina en lengua Zeona* of 416 pages and another MS. of 116 pages. He expected to present them to the public library of Bogota, but I have not been able to ascertain whether they are there.

From these materials I present the following list of tribes who should be classed in this linguistic family:

The Betoya Linguistic Stock.

Acanejos, a branch of the *Tamas*.
Aguaricos, a branch of the *Tamas*.
Airicos (Ayricos), adjoin *Betoyes* to the south.
Amaguages, on upper Caqueta.
Anibalis, on Rio Apure.
Atuaras, a branch of the *Tamas*.
Avijiras, on Rio Napo.
Becuaries, a branch of the *Icaguates*.
Betoyes, on and near R. Casanare.
Cenceguages, on upper Putumayo south of the *Correguages*.
Ceonas = *Zeonas*.
Cobeus, north of the *Tucanos*.
Correguages, on head waters of Caqueta and Putumayo.
Cungies (Kemgeioios), on R. Cungies, a branch of R. Putumayo.
Curetus (Coretus), west of the *Tucanos*.
Dacé = *Tucanos*.
Eles, north of *Betoyes*, on Rio Casanare.
Encabellados = *Piojes*.
Icahuates (*Icaguates*, *Icaguages*), former name of *Piojes*.
Jamas, on Rio Manacacia.
Jaunas, near River Uauper.

Jupuas, on Rio Apaporis.
Lolacos, a branch of the *Betoyas*.
Macaguages, on Rios Caucaya, Mecaya and Sensella.
Magueias, a branch of the *Icahuates*.
Malifilitos, a branch of the *Betoyas*.
Neguas, a branch of the *Tamas*.
Oeoguages, on R. Putumayo, near R. Pineya.
Pararies, a branch of the *Zeonas*.
Payaguas, a branch of the *Icahuates*.
Pequeyas, a branch of the *Piojes*.
Piojes, on Rios Putumayo, Napo and Cocaya.
Pouzevaries, a branch of the *Icahuates*.
Quiiifayes, on Rio Apure.
Seizos, a branch of the *Tamas*.
Seones = *Zeonas*.
Situfas (or *Situjas*), on Rio Casanare.
Tamas, on Rio Yari and R. Cagua.
Tucanos, on the Rio Uaupes.
Uaupes, on R. Uaupes.
Yapuas, a branch of the *Piojes*.
Yehebos, a branch of the *Icahuates*.
Ytes, a branch of the *Piojes*.
Zenseies, a branch of the *Zeonas*.
Zeonas, between lower Napo and Patumayo rivers.

Several of these names are synonyms, or merely the same word with varying orthography. The specific termination of *nomina gentilia* in the Betoya dialects would seem to be *guage*, which is perhaps the *guce*, house, household, people, of the Correguage. Thus, *Oco-guage* = water people, this tribe, according to Markham, being remarkably skillful canoemen. *Yete* is the Corr. for "hands." "*Pioje*" is the negative "no," with which these natives reply to all inquiries addressed them by travelers. Other of the names belong to the Lingoa Geral; as, *Payagua* = enemies; *Pararie* (*parauara*), parti-colored, *i. e.*, painted men; *Atuara* = the basket (making) men; *Jupua* in the Jauna dialect means "tree" or "wood" men, while *Jauna* means, in the *lingoa geral*, "water-men." *Dacé* is the name of the Toucan bird in the Tucano dialect. "Curetu" in the *lingoa geral* is an opprobrious epithet, "rascals." It was applied to several tribes. Balbi, in his *Atlas Ethnographique*, gives a short vocabulary of one of these "rascal" tribes, who lived at Ega on the Amazon. It has no connection with the Curetu of the Rio Apaporis.

The Jupua and Curetu dialects are properly one and the same, the difference which appears in their vocabularies arising simply from inequality in the ears and the orthographies of observers. This is evident by the following comparison of the vocabularies of Martius (German orthography) and Wallace (English orthography):

	Jupua (Martius).	Curetu (Wallace).
Blood,	*thik,*	*dü.*
Bow,	*patopai,*	*patueipei.*
Earth,	*thitta,*	*ditta.*
Flesh,	*ga'hi',*	*se'hea'.*
Finger,	*moh-asoing,*	*mu-etshu.*
Fire,	*pieri,*	*piure.*
Flower,	*pagari,*	*bagaria.*
Foot,	*göaphæ,*	*giapa.*
Hair,	*poa,*	*phoa.*
Hand,	*moho,*	*muhu.*
Head,	*co'ëre,*	*cuilri.*
House,	*wu'i,*	*wee.*
Mouth,	*thischüh,*	*dishi.*
Sun,	*hauvã,*	*aoué.*
Tongue,	*toro,*	*dolo.*
Tooth,	*gobâckaa',*	*gophpecuh.*
Water,	*thãco,*	*deco.*
Woman,	*nomöa,*	*nomi.*

These two, the Jupua and Curetu, together with the Jauna and Cobeu, form with the Tucano a group of dialects closely related among themselves; and they are a branch of the same mother tongue as the Betoya, Tama, Pioje and Correguage, which, in turn, present also merely dialectic differences between each other.*

In spite of the imperfect materials yet available to study this extended family, the relationship of its scattered members is demonstrable. To illustrate it, I submit the following:

Comparative Vocabulary of the Betoya and Tucano Dialectic Groups.

Betoya Group: B. = Betoi; C. = Correguage; P. = Pioje; T. = Tama.
Tucano Group: Cob. = Cobeu; Cur. = Curetu; Jup. = Jupua; Tuc. = Tucano.

* Dr. Pfaff (u. s. p. 603) has compared five words of the Tucano, Coretu and Cobeu, presenting similarities; and Dr. Ernst (*Zeitschrift für Ethnol.*, 1891) has shown similarities of six words in Tamas and Tucano; but a general survey of the stock has not heretofore been offered.

Man,	*umasoi*, B.; *emiud*, C.;	*eum*^{a}, *imea*, Tuc.; *ermeu*, Cob., Cur.
Woman,	*domi*, C.; *romeo*, T.;	*nomi*, Cur.; *nomio*, Tuc.
Fire,	*to'a*, P., T.; *fu-tui*, B.;	*toua*, Cob.
Water,	*oco*, B., C., P., T.;	*oco*, Tuc.; *hóggoa*, Jup.
Rain,	*oco-raime*, C.;	*oco-ro*, Tuc.
Tongue,	*chimenu*, P.;	*chemeno*, Tuc.; *erimendo*, Cob.
Hand,	*r'umocoso* (my hand),	*umoca*, Tuc.
Foot,	*coapi*, C.;	*göaphae*, Jup.; *giapa*, Cur.
Teeth,	*cojini*, C.;	*coping*, Cob.
Nose,	*j'inkepiu* (thy), C.;	*enkenha*, Tuc.
Forehead,	*siapue*, C.; *jopue*, T.;	*dipua*, *righpoah* (head), Tuc.
Breast (mamma),	*oχecho*, C.;	*oχ-penno*, Tuc.
Meat,	*guai*, C.;	*ga'hi*, Jup.
Maize,	*huka*, P.;	*o-hoka*, Tuc.
Jaguar,	*ia'i*, P.; *chai*, C.;	*jih*, Jup.
Parrot,	*gueco*, C.;	*weχki*, Tuc.
Deer,	*ñama*, C.;	*ikama*, Jup.
Egg,	*tsia*, C.;	*dia*, Cur.
Fowl,	*cura*, C.;	*caru-hin*, Cob.
Monkey,	*tangue*, C.;	*aχke*, Tuc.
Stone,	*cata*, C.;	*iχtana* (=*i-cata-na*), Tuc.
Star,	*manioco*, C.;	*jocheo'*, Jup.; *ambiocowa*, Cor.; *ua'coa*, Tuc.
Banana,	*ohoh*, P., C.;	*ohoh*, Tuc.
Son,	*sii*, C.;	*si-mugi*, Cur.
Sky,	*quen-eme*, C.;	*imina*, J.; *imi-se*, Tuc.
Canoe,	*choque*, C.;	*yuki*, Tuc.
Devil,	*guatò*, C.;	*ouatin*, Tuc.
Enemy,	*paí-name*, C.;	*ua-paí*, Tuc.
Farewell,	*sayé*, P.;	*uâyé*, Tuc.

In other words, although the identity of the radicals exists, it is not visible in the forms presented. Thus, in Wallace's vocabulary both "sun" and "moon" are rendered by *uipo*, which is the Betoya *ubo*, sky, heaven.

Domi, *nomio*, "woman," is really a compound of the Betoya feminine *ro*, female, and *emi*, or *uma*, "man" (homo), as is easily seen in the Tama *ro-meo*.

Very few analogies are visible to the Tapuya (Gēs) dialects, to which the Tucano has usually been assigned. The only one of importance is the word for fire, *pekhămi* (Tuc.), *păhgă* (Jauna), which appears to be the Botocudo *pĕk*.

The conception of number is very slightly developed in this stock, and even the dialects most closely related show wide variations; for example:

	Betoya.	Tama.	Pioje.
1,	*edoyoyoi*,	*teyo*,	*moño* (finger).
2,	*edoi*,	*ca'yapa*,	*tsamun-cua*.
3,	*ibutu*,	*cho-teyo* (2+1),	*tsamun-huente-cua*.
4,	*ibutu-edoyoyoi* (3+1),	*ca'yapa-ria* (2 again),	*tajeseca*.
5,	*ru-mocoso* (hand),	*cia-jente* (hand),	*teserapin*.

In the vocabularies both *moko* and *jente* (*jete*) are given for hand, and both are used in the words for "five."

In the Tucano group the dialect which has retained the strongest affinities is the Curetu:

	Curetu
One,	*tchudyu* (= Betoya *ĕdyuyu*).
Two,	*ap-adyu* (= " *ĕdyu*).
Three,	*arayu*.
Four,	*apaedyái* (=2+2).
Five,	*tchumupa*.

I believe the evidence here briefly presented will be adequate to prove the extended affinities of this stock, and to vindicate its importance in South American ethnography. How far its analogies may be traced north and west I have not sufficient materials to determine. In *The American Race*, p. 275, I pointed out a few similarities between Betoya and Choco roots; and I would particularly mention that the words for "man" and "woman," *uma* and *ira*, reported by early explorers (in 1515) as in use along the northern shore of Venezuela and the Isthmus of Panama, certainly belong to the Betoya language.*

* "En toda esta tierra llaman à los hombres *omes*, y à las mugeres *iras*." See J. Acosta, *Historia de Nueva Granada*, p. 453. The tract referred to is from the Gulf of Uraba to the Punto del Nombre de Dios, along the shore of the Isthmus of Panama.

Stated Meeting, January 15, 1892.

Present, 47 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A circular from the Observatoire National Astronomique et Météorologique d'Athènes, asking exchanges, which was agreed to.

A circular from M. Julio N. Rosas, announcing his appointment as Director Général de Statistique de la Provincia de Buenos Aires, La Plata.

A circular from the Royal Geographical Society, on the orthography of geographical names.

Letters of envoy from the Observatory, Adelaide, S. Australia; Biblioteca N. C. di Firenze; Musée Guimet, Paris; Meteorological Office, Zoölogical Society, London, Eng.

Letters of acknowledgment from the Royal Geographical Society of Australasia, Melbourne, Victoria (131–134); Tokyo Library (135); Prof. Dr. Ludwig Rütimeyer, Basel, Switzerland (135); Direccion General de Estadistica de la Provincia de Buenos Aires, La Plata (131, 132, 133, 134).

Accessions to the Library were reported from the Observatory, Adelaide, Australia; Count R. d'Hulst, Alexandria, Egypt; Anthropological Society, Tokyo; Société Imp. des Naturalestes, Moscow; Physical Central-Observatoriums, Bibliotheque Geologique de la Russie, St. Petersburg; Academie R. de Belgique, Bruxelles; K. Nordiske Oldskrift Selskab, Copenhagen; Physiologische Gesellschaft, Berlin; R. Ministero della Instruzione Publica, Firenze; R. Istituto Lombardo, Milan; Société des Antiquaires de Picardie, Amiens, France; Société Historique, Littéraire, etc., Du Cher, Bourges; Société de Borda, Dax; Société des Sciences Naturelles, etc., de la Creuse, Guéret; Société des Sciences Naturelles, La Rochelle; École des Mines, Musée Guimet, Société Zoologique de France, Société D'Anthropologie, Société N. des Antiquaires de France,

Paris; Société de Géographie, Toulouse; Académie N. des Sciences, etc., Bordeaux; Société des Antiquaires de la Morinie, Saint Omer; Zoölogical Society, London; Geological Society, Manchester; Natural History Society, Montreal; Historical and Scientific Society of Manitoba, Winnepeg; Harvard University, Cambridge, Mass.; Travelers' Insurance Co., Hartford, Conn.; Editors of the "American Journal of Science," Agricultural Experiment Station, New Haven, Conn.; Agricultural Experiment Station, Storrs, Conn.; Mathematical Society, New York; Engineers' Club, College of Pharmacy, Franklin Institute, Hydrographic Office, Dr. Charles A. Oliver, Philadelphia; State Board of Health, Nashville; Experiment Station of Florida, Lake City; Editor of "Journal of Comparative Neurology," Cincinnati, O.; Sociedad Cientifica "Antonio Alzate," Mexico.

The decease of the following members was announced:

General Montgomery C. Meigs, Washington, D. C.; born May 3, 1816; died January 2, 1892.

Mr. Addison May, West Chester, Pa.; died January 8, 1892, æt. 80.

Mr. Edward Penington, Philadelphia; died December, 1891.

Prof. Jean Louis Armand de Quatrefages, at Paris, January 12, 1892, æt. 82.

This being the evening for the selection of the Standing Committees of the Society, for the ensuing year, on motion the President was authorized to appoint the same, which he subsequently did as follows:

Finance.

William B. Rogers, Philip C. Garrett, Charles S. Wurts.

Hall.

J. Sergeant Price, William A. Ingham, Charles A. Oliver.

Publication.

Daniel G. Brinton, George H. Horn, Samuel Wagner,
Patterson Du Bois, Horace Jayne.

Library.

Edwin J. Houston, William John Potts, Jesse Y. Burk,
William H. Greene, William S. Baker.

Michaux Legacy.

Thomas Meehan, J. Sergeant Price, William M. Tilghman,
Isaac Burk, Isaac C. Martindale.

Henry M. Phillips' Prize Essay Fund.

Richard Vaux, Henry Phillips, Jr., William V. McKean,
Furman Sheppard, Joseph C. Fraley,
The President and the Treasurer of the Society, *ex officio*.

This being the evening for the election of Librarian, a ballot was held and the tellers reported that Mr. Henry Phillips, Jr., had received 28 votes and Mr. Benjamin Smith Lyman had received 12 votes; whereupon Mr. Phillips was declared duly elected Librarian for the ensuing year.

[Secretary Phillips present and not voting.]

Pending nominations Nos. 1232 and 1233, and new nominations Nos. 1234, 1235, 1236, 1237, 1238, 1239 and 1240 were read.

The Committee appointed to examine the paper of Prof. Cope, offered at the last meeting for the Transactions, reported progress and was continued.

Dr. Brinton presented the following papers for the Proceedings: "On the Mazatecan Language of Mexico, and its Affinities," and "Observations on the Chinantec Language of Mexico."

The Committee on the Michaux Legacy presented a paper on "The Temperate and Alpine Floras of the Giant Volcanoes of Mexico," by Prof. Angelo Heilprin, which was ordered to be printed as a part of its report.

The report of the Committee, on the Publications of the Society, appointed December, 1890, was then taken up.

The report was then read, signed by the Chairman and three

other members of the Committee, the Chairman stating in answer to inquiry that the signature of the other member was withheld on account of his not approving the second resolution. The resolutions were then read as follows:

Resolved, 1. That the Proceedings of the American Philosophical Society be issued quarterly, and also at more frequent periods whenever an amount of matter is ready for press, which will make sixty-four pages of text, but so as not to interfere with the regularity of the quarterly issue.

Resolved, 2. That in order to permit estimates of the cost of illustrations, authors shall submit either completed drawings or the specimens to be drawn; and that the Secretaries shall accept either as sufficient basis for the publication of articles otherwise unobjectionable.

On motion of Dr. Frazer, the Society proceeded to the consideration of report of the first resolution. A debate took place thereon, participated in by Messrs. Price, Morris, Houston, Cope, Frazer, Barker, Vaux, Martindale and Horn.

Mr. Martindale moved to strike out all after the word "quarterly" and to insert thereafter the words "provided sufficient material shall be furnished for that purpose."

The amendment being put to a vote was carried and a vote being taken on the resolution as amended it was adopted.

The question then arising on the adoption of the second resolution, Dr. Brinton stated his reasons for declining to recommend the same, and offered as an amendment the substitution of the word "may" for "shall" in the third line, to read "the Secretaries may, etc."

The amendment was carried and the resolution as amended was adopted.

On motion of Mr. Dudley, the Society adjourned.

Stated Meeting, February 5, 1892.

Present, 8 members.

Dr. MORRIS in the Chair.

The following correspondence was submitted:

A letter from Commander F. M. Green, U. S. A., giving sufficient reasons for declining the membership in the Society to which he had been elected.

A circular from the Manchester Geographical Society, announcing the decease of its President, the Duke of Devonshire.

A letter from Gustav Fock, bookseller in Leipzig, offering for sale the library of the late Prof. Zarnke for 45,000 marks.

Accessions to the Library were announced from the Royal Society of South Australia, Prof. H. Y. L. Brown, Adelaide; Linnean Society of N. S. Wales, Sydney; Prof. H. H. Risley, Calcutta; Section für Naturkunde O. T. C., Vienna; K. danske Geografiske Selskab, Copenhagen; Gesellschaft für Erdkunde, Deutsche Geologische Gesellschaft, Horticultur-Gesellschaft, Messrs. Friedländer & Sons, Berlin; K. Sächsische Meteorologische Institut, Chemnitz; Société des Sciences Naturelles, Fribourg; Verein für Erdkunde, Halle a. S.; Verein für Thüringische Geschichte und Altertumskunde, Jena; K. Sächsische Gesellschaft der Wissenschaften, Leipzig; K. B. Akademie der Wissenschaften, Munich; R. Societatas Scientiarum, Upsal; État Indépendant du Congo, Bruxelles; Société Vaudoise des Sciences Naturelles, Lausanne; Société de Géographie, Lille; Université de Lyon; Société de L'Enseignement Supérieur, Marquis de Nadaillac, Paris; R. Academia de la Historia, R. Academia de Ciencias, etc., Madrid; Meteorological Council, R. Statistical Society, Society of Arts, Royal Society, Editors of the "Geological Magazine," Mr. Frederick Arthur Crisp, London; Agricultural Experiment Stations at Bangor, Me., Amherst, Mass., Kingston, R. I., Auburn, Ala., College Station, Tex., Corvallis, Oreg., Laramie, Wyo.; National Civil Service Reform League, Boston;

Hon. Robert C. Winthrop, Prof. Eben Norton Horsford, Harvard University, Cambridge; Essex Institute, Salem; Brown University, Providence, R. I.; Prof. E. North, Clinton, N. Y.; Free Public Library, Jersey City; Bureau of Statistics of New Jersey, Trenton; American Pharmaceutical Association, Drexel Institute, Drs. J. E. Ives, D. Jayne, J. C. Ayer, Mr. Henry Phillips, Jr., Philadelphia; American Chemical Society, Baltimore; Anthropological Society, Bureau of Navigation, Mr. Lester F. Ward, Washington, D. C.; Oberlin College, Oberlin, O.; Colorado Scientific Society, Denver; Observatoire Météorologique Central, Observatorio Astronómico Nacional de Tacubaya, Mexico; Observatorio Nacional Argentino, Buenos Aires; Museo de La Plata; Prof. Ladisláu Netto, Rio de Janeiro.

The Committee on Dr. Cope's Paper for the Transactions reported the same to be worthy of publication and was discharged.

Photographs of the following members were presented for the Society's Album:

Dr. Thomas Chase, Providence, R. I.

Dr. J. L. Campbell, Crawfordsville, Ind.

Dr. W. G. A. Bonwill, Philadelphia.

Mr. Charles Truscott presented a photograph from the portrait of Franklin owned by the Society.

Miss Emily Phillips presented a locket containing hair of General Andrew Jackson.

The following announcements of the deaths of members were made:

Paul Hunfalvy, Budapesth, December, 1891.

Andrew C. Ramsay, London, December, 1891.

Thomas Jefferson Lee, Baltimore, December, 1891.

Rev. Joseph F. Garrison, Camden, N. J., January, 1892, æt. 70.

The President appointed Mr. William John Potts to prepare the obituary notice of Dr. Garrison.

Prof. Cope offered for the Transactions a paper by himself on "The Homologies of the Posterior Cranial Arches in the

Reptilia," which was referred to a Committee to be appointed by the President.*

Dr. Cope offered for the Proceedings "A Contribution to the Vertebrate Palæontology of Texas."

Dr. Brinton presented for the Proceedings "Studies in the South American Native Languages," which was ordered to be printed.

The paper by Dr. Bonwill, "Geometry and Mechanics Deny Evolution," was made the special order for March 4, 1892.

Pending nominations 1232 to 1240 (inclusive) were read.

On motion of Dr. Brinton, it was resolved that a Committee of three should be appointed by the President to consider the advisability of taking concerted action in connection with other learned societies for the celebration of the four-hundredth anniversary of the discovery of America. †

And the Society was adjourned.

Stated Meeting, February 19, 1892.

Present, 12 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

Acknowledgments (136) were received from the Geological Survey, Otfawa; Canadian Institute, Toronto; N. S. Institute of Science, Halifax; Society of Natural History, Maine Historical Society, Portland, Me.; Agricultural Experiment Station, Amherst; Prof. C. H. Hitchcock, Hanover, N. H.; Vermont Historical Society, Montpelier; State Library of Massachusetts, Historical Society, Boston Public Library, Society of Natural History, Mr. Robert C. Winthrop, Boston;

*The President subsequently appointed as such Committee, Drs. Ryder, Jayne and Sharp.

†The President subsequently appointed as such Committee, Drs. Brinton, Cope and Frazer.

Museum of Comparative Zoölogy, Profs. A. Agassiz, Charles W. Eliot, Robert N. Toppan, Cambridge, Mass.; Dr. Pliny Earle, Northampton, Mass.; Essex Institute, Salem; American Antiquarian Society, Worcester; Brown University, R. I. Historical Society, Providence; Mr. George F. Dunning, Farmington, Conn.; Historical Society, Theological Seminary, Hartford; Yale University, N. H. Colony Historical Society, Profs. O. C. Marsh, H. A. Newton, W. D. Whitney, New Haven; Prof. James Hall, Albany; Society of Natural Sciences, Buffalo Library, Buffalo, N. Y.; Prof. E. North, Clinton, N. Y.; Profs. J. M. Hart, J. E. Oliver, Ithaca, N. Y.; American Museum of Natural History, Mathematical Society, Meteorological Observatory, New York Historical Society, Hospital Library, University of the City of New York, General Henry L. Abbot, Mr. Joel A. Allen, Prof. J. J. Stevenson, New York; Vassar Brothers Institute, Poughkeepsie; Oneida Historical Society, Utica; U. S. Military Academy, West Point; Prof. Henry M. Baird, Yonkers; Mr. Isaac C. Martindale, Camden, N. J.; Profs. W. H. Green, C. A. Young, Princeton; Dr. Robert H. Allison, Ardmore, Pa.; Mr. Burnet Landreth, Bristol; Prof. Robert W. Rogers, Carlisle; Prof. Martin H. Boyè, Coopersburg; Hon. Eckley B. Coxe, Drifton; Rev. Thomas C. Porter, Prof. J. W. Moore, Dr. Traill Green, Easton; Prof. Lyman B. Hall, Haverford College P. O.; Mr. Ario Pardee, Hazleton; Mr. John Fulton, Johnstown; Academy of Natural Sciences, Engineers' Club, Wagner Free Institute, Numismatic and Antiquarian Society, Philadelphia Library, Drs. W. G. A. Bonwill, H. C. Chapman, George Friebis, W. W. Keene, George R. Morehouse, Isaac Norris, Charles A. Oliver, C. N. Peirce, W. S. W. Ruschenberger, H. Clay Trumbull, Profs. John Ashhurst, Jr., F. A. Genth, Jr., H. D. Gregory, J. P. Lesley, John Marshall, Samuel P. Sadtler, H. W Spangler, Messrs. Henry Carey Baird, William S. Baker S. Castner, Jr., Thomas M. Cleemann, Patterson Du Bois, J. S. Harris, William A. Ingham, W. W. Jefferis, G. de B. Keim, James T. Mitchell, C. Stuart Patterson, Henry Phillips, Jr.,

Franklin Platt, Theodore D. Rand, Samuel Wagner, Talcott Williams, Admiral E. Y. Macauley, Philadelphia; Mr. Heber S. Thompson, Pottsville; Rev. G. W. Anderson, Rosemont, Pa.; Philosophical Society, Messrs. William Butler, Philip P. Sharpless, W. Townsend, West Chester; Maryland Institute, Baltimore; Agricultural Experiment Station, College Park; Leander McCormick Observatory, University of Virginia, Prof. J. W. Mallet, Charlottesville, Va; Agricultural Experiment Station, Prof. I. C. White, Morgantown, W. Va.; N. C. Agricultural Experiment Station, Raleigh; University of Alabama, University P. O.; Agricultural Experiment Station, College Station, Tex.; Prof. E. W. Claypole, Akron, O.; Cincinnati Observatory; Editor of the "Journal of Comp. Neurology," Granville, O.; Columbia Athenæum, Tenn.; Prof. J. L. Campbell, Crawfordsville, Ind.; Experiment Station, La Fayette, Ind.; Historical Society, Chicago; Academy of Science, St. Louis; Geological Survey of Missouri, Jefferson City; General William F. Reynolds, Detroit, Mich.; Kansas Academy of Science, Topeka; State Historical Society, Madison, Wis.; University of California, Berkeley; Prof. George Davidson, San Francisco, Cal.

Letters of acknowledgment were received from the Tokyo Anthropological Society (135); Société de Geographie, Bucarest, Roumania (135); University Library, St. Petersburg (135); Société de Géographie de Finlande, Helsingfors (131–135); Société R. des Sciences, Upsal, Sweden (134); Maatschappij de Nederlandsche Letterkunde, Leiden (135); Société Neuchateloise de Geographie, Neuchatel (135); Redaction der "Naturwissenschaftlichen Wochenschrift," Berlin (135); Naturforschende Gesellschaft in Emden (135); Oberhess. Gesellschaft f. Natur. u. Heilkunde, Giessen; M. Otto Böhtlingk, Leipzig (135); Société des Sciences Naturelles, etc., Guéret, France (135); Prof. Léon de Rosny, Paris (134, 135); Société des Antiquaires de la Morinie, St. Omer (131–134); R. Istituto di Studi Superiori, Florence, Italy (135); Bowdoin College, Brunswick, Me. (96–130, 132–136, and Catalogue, Parts i–iv); Mr. George F. Dunning, Farmington, Conn. (135);

Free Public Library, Jersey City (96–130, 136, and Catalogue, Parts i–iv).

Letters of envoy were received from the Société de Géographie de Finlande, Societas pro Fauna et Flora Fennica, Helsingfors; Naturwissenschaftliche Verein für Schleswig-Holstein, Kiel, Prussia; K. Sächsische Gesellschaft der Wissenschaften, Leipzig; Société Royale des Sciences, Upsal, Sweden; R. Academia de Ciencias y Artes, Barcelona, Spain; Royal Statistical Society, Lowdon; Boudoin College, Brunswick, Me.; Messrs. J. C. Ayer & Co., Lowell, Mass.; Observatoire Météorologique Central de Mexico.

Accessions to the Library were reported from the Geological Survey of India, Calcutta: Magyar Tudományas Akadémia, Société Hongroise de Géographie, Budapesth; Société de Geographie de Finlande, Societas pro Fauna et Flora Fennica, Helsingfors; Société Royale de Geographie, Antwerp; Gesellschaft für Anthropologie, Ethnologie, etc., Berlin; Naturwissenschaftlicher Verein für Schleswig-Holstein, Kiel; Publishers of the "Revue Universetaire," Paris; R. Academia de Ciencias y Artes, Barcelona, Spain; Royal Society, Royal Geological Society, London; Royal Society, Edinburgh; Philosophical Society, Cambridge, Eng.; Bowdoin College, Brunswick, Me.; Harvard College, Cambridge, Mass.; Prof. William Dwight Whitney, New Haven; Astor Library, Academy of Sciences, American Museum of Natural History, Dr. T. Sterry Hunt, New York; Hon. Thomas H. Dudley, Camden; Mr. Albert S. Gatschet, Washington, D. C.; Public Library, Cincinnati; State Historical Society, Iowa City; Wyoming Agricultural College, Laramie; Missouri Geological Survey, Jefferson City; Dr. John C. Branner, Little Rock, Ark.; Academy of Science, Tacoma, Wash.; Prof. J. de Mendizábel Tamborrel, Mexico.

The Committee appointed at last meeting to examine Prof. Cope's paper for the Transactions, reported it worthy of publication, and was discharged.

The deaths of Theodore Mommsen (February 3, 1892, æt. 75) and T. Sterry Hunt (February 12, 1892, æt. 66) were announced.

On motion, the Society appointed Mr. James Douglass, of New York city, to prepare the usual obituary notice of Dr. Hunt.

The proceedings of the Board of Officers and Council were submitted.

This being the stated evening for balloting for candidates for membership, pending nominations Nos. 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239 and 1240 were read, spoken to and voted upon.

Prof. Cope made an oral communication on "The Geology of the Staked Plains of Texas."

The Committee on Extended Accommodations presented a final report, and stated that the total cost of alterations to the building had amounted to $41,449.72.

On motion of Dr. Brinton, the report was accepted and the Committee discharged, with the hearty thanks of the Society for its long, arduous and faithful labors.

The Library Committee reported the following minute:

STATED MEETING, FEBRUARY 12, 1892.

The Librarian reported that owing to the advanced condition of the Library he had been able to dispense with the services of the assistants hitherto employed by the Committee, and pursuant to authority granted him by the Chairman he had discharged them.

The action of the Librarian was approved.

The Librarian was directed to purchase the New Century Dictionary, the Supplement to Allibone's Dictionary, and U. S. wall map.

Dr. Morris, on behalf of the Curators, reported that the Peale collection of relics of the Stone Age had been placed in the Society's museum, and that all expenses connected with the transfer of the same had been borne by Mr. Robert Patterson, to whom the thanks of the Society were tendered.

The thanks of the Society were tendered to Miss Emily Phillips for a gift of a locket containing the hair of General Andrew Jackson, presented at the last meeting of the Society.

All other business having been transacted, the tellers reported to the President the result of the ballot, who thereupon

declared the following to have been duly elected members of the Society:

2199. Hon. George William Curtis, New York city, N. Y.
2200. Anthony J. Drexel, Esq., Philadelphia.
2201. Prof. Edward A. Leech, Ph.D., Director U. S. Mint, Washington, D. C.
2202. Hon. Seth Low, LL.D., President Columbia College, New York city, N. Y.

Dr. E. D. Cope offered the following amendment to Chapter ix, Section 1, of the Laws:

The ordinary meetings of the Society shall be on the first and third Fridays of every month, from September to the third Friday in June inclusive, at eight o'clock in the evening.

And the Society was adjourned by the President.

Stated Meeting, March 4, 1892.

Present, 27 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:
Acceptances of membership were read as follows:
Mr. Anthony J. Drexel, Philadelphia.
Hon. Seth Low, New York city, N. Y.
Hon. George William Curtis, West New Brighton, Staten Island, N. Y.

A circular was received from the Linnean Society of New South Wales, announcing the death of its President, Sir William Macleay.

A letter from P. Steiner (Darmstadt) in reference to his language, *Pasilengua*.

Letters of acknowledgment were received from the Institut

Égyptien, Cairo (135); Académie R. Danoise des Sciences, etc., Copenhagen (135); K. Bibliothek, Berlin (135); Deutsche Seewarte, Hamburg (135); Verein für Erdkunde, Netz (135); R. Accademia di Scienze, etc., Padova (135); Natural History Society, Montreal (136); Mr. Hamilton A. Hill, Boston (136); Free Public Library, New Bedford, Mass. (136); Prof. Burt G. Wilder, Ithaca, N. Y. (136); American Museum of Natural History, New York city (97, 99, 100, 101, 127–135); New Jersey Historical Society, Newark (136); Messrs. Cadwalader Biddle, Samuel Dickson, Philadelphia (136); Maryland Historical Society, Baltimore (136); U. S. Naval Observatory, U. S. Coast and Geodetic Survey, Anthropological Society, Patent Office, War Department (136), Department of Agriculture (136), Dr. W. J. Hoffman, Rt. Rev. J. J. Keane, Capt. Thomas Jefferson Lee, Messrs. Charles A. Schott, William B. Taylor, Washington, D. C. (136); University of Tennessee, Knoxville (136); Georgia Historical Society, Savannah (136); University of Cincinnati (99–130, and Catalogue, Parts i–iv); Colonel William Ludlow, Detroit, Mich. (136); Indiana Society of Civil Engineers, Remington (136); Lick Observatory, Mount Hamilton, Cal. (96–130, 136, and Catalogue, Parts i–iv); Sociedad Cientifica "Antonio Alzate," Mexico (136); Academy of Science, Tacoma, Wash. (96–130, 136, and Catalogue, Parts i–iv); Wyoming University Experiment Station, Laramie (136).

Accessions to the Library were reported from the K. N. F. Universitetel, Christiania, Norway; Statistika Central Byrån, Stockholm, Sweden; Académie R. Danoise des Sciences, etc., Copenhagen; Prof. P. Steiner, Darmstadt, Germany; Prof. Léon Douay, Nice, France; Academy of Arts, San Fernando, Spain; Société de Geographie, Lisbon, Portugal; Sir J. D. Hooker, London, Eng.; Theological Seminary, Andover, Mass.; Harvard College, Cambridge, Mass.; John M. Berry, Worcester, Mass.; Rochester Academy of Science; Free Public Library, Jersey City; Mr. W. J. Potts, Camden; Historical Society of Pennsylvania, Academy of Natural Sciences, Dr. Persifor Frazer, Messrs. MacCalla & Co., Dr.

Charles A. Oliver, Philadelphia; U. S. Naval Observatory, War Department, Treasury Department, Washington, D. C.; Agricultural Experiment Stations, Virginia, Mississippi, Arkansas; Denison University, Granville, O.; State Historical Society of Wisconsin.

The amendment to the Laws of the Society (Chap. ix, § 1) came up for action. Due proof of advertisement and notice of same having been first submitted, and a constitutional quorum being present, the Society then proceeded to consider the same.

Dr. Cope moved that it be adopted.

Mr. Vaux moved as an amendment that it be indefinitely postponed.

A vote being taken, Mr. Vaux's motion was carried, and the consideration of the amendment was indefinitely postponed.

The Publication Committee reported that the papers by Dr. Cope had been placed in the printers' hands, and that the illustrations to accompany them had been ordered to be prepared; and that Vol. xvii, Part i, had been ordered to be closed and distributed when printed.

Dr. Bonwill read a paper entitled "Geometry and Mechanics Deny Evolution," which he illustrated with diagrams and specimens.

Dr. Cope spoke against some of the propositions set forth by Dr. Bonwill, and exhibited specimens of early dentition from Spuj, Belgium.

Dr. Cope offered for the Proceedings a paper on "Tiaporus, a New Genus of Teiidæ."

Mr. Price, Chairman of the Hall Committee, presented the following report:

To the American Philosophical Society:

The Hall Committee respectfully reports that they have carefully considered the matter of a fireproof in the new building to preserve the valuable books, papers and documents belonging to the Society, which was referred by it to them. They have called in consultation with them Messrs. Wilson & Bros., the architects of the building, who have prepared detailed drawings for the construction of a fireproof 4 feet by 14 feet in

the clear inside and reaching from the floor to the ceiling, and situate in the southeast corner of the northern room on second floor, which will afford ample room for many years to come for the protection from fire of valuable books, papers and documents and articles of various kinds, which may need such care and preservation. They have also received an estimate from Messrs. Stacy Reeves & Sons to construct and complete the same for the sum of $278. They therefore submit the following resolution :

Resolved, That the report of the Committee be accepted, and they are directed to have said fireproof constructed under the direction of the architect, in accordance with the plans prepared by them.

All of which is respectfully submitted.

J. SERGEANT PRICE, *Chairman.*

On motion of Mr. Price, the report was accepted, and the resolution contained therein was adopted by the Society.

Mr. Williams offered the following resolution, which after discussion was adopted by the Society:

Resolved, That a Committee of three be appointed by the President, to consider and report to the Society upon the advisability of an annual grant for the purpose of aiding the publication or assuming the entire cost of publishing transcripts of the Babylonian tablets, on deposit in the Museum of the University of Pennsylvania.*

And the Society was adjourned by the President.

Stated Meeting, March 18, 1892.

Present, 9 members.

Mr. WOOD in the Chair.

Correspondence was submitted as follows:

Letters of envoy were received from the Société de Litteraire Finnoise, Helsingfors; K. Sächsische Gesellschaft der Wissenschaften, Leipzig; Meteorological Office, London; Museum of Comparative Zoölogy, Cambridge, Mass.; Department of State, Washington, D. C.

* The President subsequently appointed Messrs. Williams, Du Bois and Price as such Committee.

Letters of acknowledgment were received from Marquis Antonio de Gregorio, Palermo, Sicily (135); Sir J. W. Dawson, Montreal, Canada (136); Agricultural Experiment Station, Geneva, N. Y. (135, 136); Geological Society of America, Rochester, N. Y. (136); Prof. Henry Morton, Hoboken, N.J. (136); Dr. Charles B. Dudley, Altoona, Pa. (136); Mr. R. Meade Bache, Hon. Henry Reed, Philadelphia (136); Prof. Charles V. Riley, Washington, D. C. (136); State Experiment Station, Baton Rouge, La. (135, 136); Washburn College, Kansas State Historical Society, Topeka, (136); Colorado Scientific Society, Denver, (136); Museo Oaxaqueño, Oaxaca, Mex. (136); Observatorio Astronómico Nacional, Mexicano, Tacubaya (136); Bishop Crescencio Carillo, Merida, Mex. (136).

Accessions to the Library were reported from the Société Litteraire Finnoise, Helsingfors; Colonial Museum, Harlem, Holland; Académie des Sciences, Cracow, Austria; Zoologisch-Botanische Gesellschaft, K. Geologische Reichsanstalt, Anthropologische Gesellschaft, Vienna, Austria; Instituto y Osservatorio de Marina, San Fernando, Spain; Rousdon Observatory, Lyme Regis, Eng; Society of Antiquaries, Meteorological Council, London; Editors of the Journal of Philology, Cambridge; American Institute of Electrical Engineers, Prof. J. A. Allen, New York; Mr. William John Potts, Camden; College of Physicians, Mercantile Library, Superintendent of City Trusts, Mr. Henry Phillips, Jr., Philadelphia; Chief of Engineers U. S. Army, Lighthouse Board, Bureau of Ethnology, Washington, D. C.; Mr. William Harden, Savannah, Ga.; Agricultural Experiment Stations, Burlington, Vt., Geneva, N. Y., State College, Centre County, Pa., Baton Rouge, La.

The decease of the following members was announced:

John Couch Adams, Cambridge, England, January 21, 1892, æt. 73.

Dr. Hermann Kopp, Heidelberg, February 20, 1892, æt. 75.

Thomas Hockley, Philadelphia, March 12, 1892, æt. 54.

Dr. Cope presented some additional matter for his paper in the Transactions, which was ordered to be printed.

PROC. AMER. PHILOS. SOC. XXX. 137. P. PRINTED MARCH 30, 1892.

Mr. Phillips presented "A Second Contribution to the Study of the Folk-Lore of Philadelphia and its Vicinity."

Pending nomination No. 1233 was read.

The Library Committee reported a minute of its last meeting.

Mr. Bache offered the following resolution:

Resolved, That, if the funds of the Society permit, this room be now put in charge of a Committee, for the purpose of receiving such treatment to its walls, ceiling, and columns as accord with the character of the Society, and that the Society instruct the Curators to exclude from the cases everything but such printed matter as is desirable for ready reference, and from the floor any articles which are not conducive to the primary purpose in this room of convenience of the members of the Society."

After some debate, the consideration of the resolution was postponed until the next stated meeting of the Society.

Dr. Morris moved that the Secretaries be requested to ask from the Academy of Natural Sciences, the Numismatic and Antiquarian Society and the Historical Society the return of all the articles belonging to this Society that are now deposited with them. After discussion, on motion of Mr. Price, as an amendment, it was resolved to refer the resolution to the Curators for the purpose of ascertaining and reporting to the Society exactly what these deposits consist of, where they are and the amount of space that will be required for their proper display in the building.

Mr. Williams offered the following resolution:

Resolved, That the busts of Lafayette and Franklin, by Houdon, in the possession of this Society, be loaned to the University Lecture Association for its loan exhibition of French art, at the Academy of Fine Arts, provided that they be returned on or before April 1, under the usual stipulation by the Curators.

And the Society was adjourned by the presiding member.

A Contribution to the Vertebrate Paleontology of Texas.

By E. D. Cope.

(*Read before the American Philosophical Society, February 5, 1892.*)

I. Fayette Formation.

In the First Annual Report of the Geological Survey of Texas (p. 47), Mr. R. A. F. Penrose, Jr., describes this formation as it occurs in South and East Texas. He places it at the summit of the Tertiary series and below the "Posttertiary;" that is, at the summit of the Neocene, just prior to the advent of the Plistocene. This location is justified by the only vertebrate fossils definitely traceable to these beds, which have been sent me for identification by Dr. E. T. Dumble, State Geologist of Texas. One of these consists of a well-preserved left ramus with symphysis and nearly complete dentition of the mandible of the large lama, *Holomeniscus hesternus* Leidy. This species is characteristic of the Equus beds of Oregon, California and Mexico, and indicates satisfactorily the age of the formation in which it occurs. It confirms fully the position assigned to the Fayette beds by Mr. Penrose. The only other identifiable fossil from this formation is several teeth of the *Equus major* Dekay. This species is most abundant in the Eastern States, where the Equus beds have not been certainly identified; but it occurs also in the Equus bed of Nueces county, Texas, with other characteristic species of that epoch. The specimens of the two species named came from Wharton county. This is the first exact determination of the age of the Fayette formation from paleontological data, and is therefore of much interest, as it enables us to correlate a definite horizon of the East with the Equus bed of the Pacific region. The determination of King and myself that the Equus bed is upper Pliocene is confirmed; since besides Penrose, Chamberlin assures us that the Fayette formation (Appomattox or Orange sand) is pre-glacial.

II. Upper Cenozoic of the Staked Plains.

In some remains of vertebrata, obtained by Mr. W. T. Cummins, from Crosby county, Texas, and sent me for determination by Dr. E. T. Dumble, State Geologist, three genera may be identified, and several others are indicated. The three genera are Equus, Mastodon and Testudo. They are enclosed in a white siliceous friable chalk, which Mr. Louis Woolman finds on examination to be highly diatomaceous. Prof. C. Henry Kain had identified the following species: *Compylodiscus bicostatus* W. Smith; *Epithemia gibba* Ehr.; *E. zebra* Ehr.; *E. gibberula* var. *producta* Ehr.; *Navicula major* Ehr.; *N. viridis* Ehr.; *N. rostrata* Ehr.; *N. elliptica* var. *minutissima* Green; *Gomphonem clavatum* Ehr.; *Cymbella cistula*, Hemp.; *Fragillaria virescens* Raffs var. The formation has been named the Blanco Canyon bed by Mr. Cummins (First Annual Report of the Geol. Survey

of Texas, 1890, p. 190) without exact determination of its position in the Cenozoics.

The Mastodon is of the *M. angustidens* type, as indicated by the teeth, but there are not enough fragments preserved to render it clear whether they pertain to this species or to some allied one. The Equus is allied to the *E. occidentalis* of Leidy, but the enamel plates are more simple than in that species, being the most simple known in the genus. I regard it as an undescribed species, and describe it below under the name of *Equus simplicidens*. A second species of horse is indicated, but an exact determination cannot be made without additional material. The tortoise is a terrestrial form. A water bird of which a tarcometatarse is contained in the collection, is kindly determined for me by Dr. Shufeldt as allied to the rails.

EQUUS SIMPLICIDENS sp. nov.

This species is represented by one nearly entire superior molar of an adult, and one of a young animal, with characteristic fragments of two other superior molars, and several fragments of inferior molars. The size of the teeth is about that of the *E occidentalis* and *E caballus*. The internal column is of moderate anteroposterior extent, its posterior border marking the anterior third of the posterior lake. Its long diameter is considerably less than half that of the crown. A peculiarity found in two of the superior molars, but not in two others, is that the median dentinal connection between the external and median crescents is interrupted by the continuity of the enamel plates bordering the lakes from the one to the other. This arrangement is frequently seen in the large pm. 3, in the species of Equus, but does not occur in the other premolars and molars. It is a reversion to the condition seen in Anchitherium. A principal character of the species is seen in the extreme simplicity of the enamel borders of the lakes. They are without inflection, except the usual loop on the posterior inner border of the anterior lake, and this is simple and widely open at the base. At the point of junction of the median crescents (meta- and paraconules), the usual loop of the internal enamel border is seen. The external median rib is narrowed and not flattened; the anterior rib is more flattened, especially at the present grinding face.

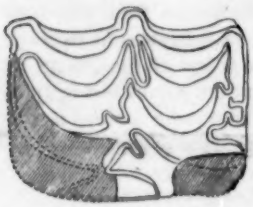


FIG. 1. *Equus simplicidens* Cope; crown of true molar of left side; natural size.

The species with which it is necessary to compare this species is the *Equus occidentalis* of Leidy. The enamel plates bordering the lakes in that species are always more complex, although they are simpler in it than in the other extinct species of North America. Even in the simplest forms (*e. g.*, that figured by Leidy in Vol. i, Report U. S. Geol. Surv. Tens., 1873, Pl. xxxiii, Figs. 1, 2) the lakes have anterior and posterior

emarginations on the inner border, which are wanting in the present species.*

The species is probably the oldest member of the genus Equus known from North American beds. It is the only species which was contemporary with a Mastodon with the *M. angustidens* type of molars. The simplicity of the enamel foldings is appropriate to this primitive period, as it approximates to the condition seen in many of the three-toed horses and the supposed one-toed *Hippidium spectans* Cope.† The size of the molars is about that of the modern horse, *E. caballus* L.

Observations.—The contemporaneity of this species of Equus with the Mastodon with molars of the *M. angustidens* type has considerable significance. The latter is characteristic of the Loup Fork horizon in North America, in which the genus Equus does not occur. The Equus beds, so named from the abundance of individuals of four species of Equus which they contain, have never produced a specimen of Mastodon allied to *M. angustidens* in North America.‡ The fact that the Equus of the Staked Plains is different from those of the Equus beds, adds to the indication furnished by the Mastodon that these beds do not belong to the Equus horizon; but the presence of the genus Equus is equally conclusive that they do not pertain to the Loup Fork. It is probable that the age of the beds is intermediate. They thus offer an interesting field for further research.

CRECCOIDES OSBORNII, Shufeldt, gen. et sp. nov.

Char. gen.—Only a fragment of a left tarso-metatarsus represents this new genus and species of bird. It evidently belonged to some wader of about the proportions of a medium-sized heron, or to a form rather larger than the Floridan crane-like rail Aramus.

The specimen consists of about the superior moiety of the tarso-metatarsus, and, in so far as it goes, appears to be perfect, with the exception of slight marginal abrasions of the summit of the bone and the almost complete fracturing off of the hypotarsial process. Superiorly, the intercondyloid prominence or tubercle is rounded and not especially conspicuous; the inner condyloid depression is more extensive than the outer one, and occupies a higher plane. In front the shaft is longitudinally excavated only above, the excavation gradually but soon disappearing as we pass down towards the distal extremity; and at the midpart of its

* The horse found in Florida by Mr. Wilcox, which Dr. Leidy identified as his *Equus fraternus* (Transac. Wagner Free Inst. Science, Philadelphia, 1889, p. 16), must be referred to a genus distinct from Equus, on account of the absence of cups of the incisors, by the loss of the internal wall. This is seen in both unworn and worn specimens. In some cases an internal cingulum remains to indicate its position. It appears to be a case of degeneracy. I have named the genus Tomolabis.

† *American Naturalist*, 1887, p. 1072.

‡ It is probable that the *Dibelodon shepardii* Leidy, which has molars of this type, occurs in the Equus beds of the valley of Mexico. Cfr. Cope, Proceed. Amer. Philos. Soc., 1884, May.

continuity it is subcylindrical upon section. A short distance below the head of the bone are seen the usual anteroposterior perforating foramina, here three in number, two being lateral and below, with a mid one just above them. Immediately below these is a single, somewhat prominent tubercle for the insertion of the tendon of the *tibialis anticus* muscle. It occupies nearly a median position upon the shaft. So far as can be ascertained from the imperfect hypotarsial process it would appear that it possessed originally a large, single, inner groove for tendons, with a plate-like projection to its outer side.

Char. specif.—Proximally, the tarso-metatarsus is considerably excavated to the inner side of the hypotarsus at a point just below the summit. The outer muscular line is single and commences at the middle point of the margin of the outer condylar depression, passing from thence down the back of the shaft. The inner muscular line bifurcates proximally, then passes more obliquely backwards than the outer line, to finally pass parallel with the latter also down the back of the shaft.

Measurements.

	MM.
Greatest transverse width of proximal end	15
Greatest anteroposterior diameter of prox. end, not including hypotarsus	11
Distance from apex of intercondyloid tubercle to the tubercle for tib. ant. muscle	10
Vertical depth of hypotarsus	10
Transverse diameter of shaft near its middle	6

Remarks.—This fragment has been compared with the corresponding part of the skeleton in a great many kinds of birds. It was found to differ entirely from all larine, gallinaceous and raptorial types, while on the other hand it seemed to combine the characters of several various species of existing waders and allied groups. The writer compared it with numerous species of the genera Guara, Plegadis, Aramus, Rallus, Crex, Porzana, Ajaja, Tantalus, Botaurus, Ardea, Nycticorax, Grus and the Gallinules, Storks, etc.

For a skeleton of *Crex pratensis* I am indebted to Mr. F. E. Beddard, prosector of the Zoölogical Society of London, and for the loan of other material to the United States National Museum, as well as to Mr. F. A. Lucas, of that institution, for placing the same at my disposal. In the specimen under consideration, the Ralline characters appear to predominate, while more remotely we may see Ibis in its general form and outline. Apart from the question of size it, however, distinctly differs from the tarso-metatarsus in such a form as *Aramus giganteus* in that the shaft was more cylindrical as it approached its midportion, and, as has been said above, did not show the anterolongitudinal excavation in that part. Moreover, in Aramus the hypotarsus exhibits *two* grooves for the passage of tendons, and the tubercle for the insertion of the *tibialis anticus* muscle

is double. Essentially, it agrees with Aramus in the *general form* of its hypotarsus and in the direction of its lateral muscular ridges. In other particulars it exhibited both some minor differences and agreements with the corresponding bone in the skeletons of Crex and Rallus. Upon the whole the specimen would appear to have belonged to some large rail-like wader, now extinct.

The name of the genus I create to contain this form is composed of the two Greek words, κρέξ, a crake, and εἶδος, resemblance. Its specific name is given it in honor of Prof. Henry F. Osborn, of Columbia College, New York, in recognition of his excellent work in paleontology for a number of years past.

The specimen was collected by Mr. W. T. Cummins, and is at present in the possession of Prof. E. D. Cope, to whom the writer is indebted for the honor of having been permitted to describe it.—*R. W. Shufeldt.*

TESTUDO TURGIDA sp. nov.

This species is represented by the greater part of a chelonite of about the size of the *Xerobates agassizii* of Arizona. It is remarkable for the remarkable depth of the dermal sutures and sculpture lines, and for the swollen character of the interspaces which separate both. The general shape is a short, wide oval, with steep to vertical margins.

The plastron is widely emarginate posteriorly, and the anal-femoral dermal sutures form a deep notch in the border. The anal scuta are oblique rhomboids, with equal and nearly parallel sides. The median longitudinal dermal suture is deep and wide, cutting half through the thickness of the plastron. It sends off a branch on each side bounding the gular plates in front. The part of the plastron enclosed in the latter forms two flattened cones appressed together, whose vertical diameter exceeds the transverse, and whose subconic apices are separated by a deep notch. The interclavicular bone is very large and is wide diamond-shaped, the anterior angle being larger than the posterior. The transverse humeropectoral suture is very deep, and is similar to the median longitudinal. The borders of the anterior lobe are strongly convex, with a chord only twice as long as the lateral border of the gular plates.

The nuchal bone has a strongly concave-emarginate border. On the posterior vertebral bones is a seat-like concavity, which is surrounded by a ridge which forms the greater part of a circle. The costal bones are unequally divided by the costal dermal sutures, which are very deep. Each costal scutum is divided into two areas, one of which is marked with ribs parallel to the vertebral axis at one extremity and a seat-shaped plane with a bordering ridge at the other, which is in some of the costals smaller and more swollen. The other half or part of the costal scutal area is swollen in the longitudinal direction, but not for its entire length. The marginal bones are massive and have a subacute border between the bridge and the median points. They are much deeper than long, and are deeply divided by the sutures which separate the dermal marginals. These

grooves cut the margin into deep notches at some points and into shallower ones at others. The areas between these sutures are all swollen in the same way as the alternate parts of the costal plates.

Measurements.

	mm.
Length of plastron anterior to posterior angle of interclavicle	80
Width of plastron anterior to posterior angle of interclavicle	112
Length of interclavicle	40
Width of interclavicle	58
Thickness of interclavicle	11
Length of free lateral margin of gular plate	29
Width of base of both gular plates	45
Length of xiphiplastral bone	32
Width of xiphiplastral bone on anterior suture	53
Width of emargination of posterior lobe of plastron	50
Diameters of free marginal near bridge: anteroposterior	20
Diameters of free marginal near bridge: vertical	34
Diameters of free marginal near bridge: transverse below	25
Diameters of marginal of bridge: anteroposterior	29
Diameters of marginal of bridge: vertical	44
Diameters of marginal of bridge: transverse below	21
Diameters of penultimate vertebral bones: anteroposterior	17
Diameters of penultimate vertebral bones: transverse	30

The American tortoise, which has produced gular areas somewhat like those of this species, is the *Testudo cultratus* Cope of the White River Neocene of Colorado. That species is, however, totally different in the dermal sutures of the usual character, flat marginals, etc., and the gular processes are not conic, but trihedral in form.

The specimen above described comes from Espuella near Dockum, from the same horizon as that of Crosby county, or the Blanco Canyon bed of Cummins.

III. On a Mesozoic Pycnodont.

Microdus dumbelii sp. nov.

This species is represented by a splenial bone of the left side, which supports four and a half rows of teeth. The external two rows include small teeth with crowns, which are either round or slightly transversely oval. The teeth of the third row are larger and the crowns are all transversely oval. The teeth of the fourth row are of unequal sizes, commencing anteriorly of about the same size as those of the third row. The third tooth from the front, as preserved, is much larger, but it is exceeded by the fourth; while the fifth is half as large again as the fourth. The sixth and last is a little smaller than the fifth. The teeth of the fifth row are as

small as those of the first and second rows, and extend posteriorly to the anterior part of the fourth of the fourth row, and not beyond. The crowns of the teeth are perfectly smooth and without keel or depression.

	MM.
Length of tooth series	17
Six teeth of external row	10
Six teeth of third row	11.5
Six teeth of fourth row	16.5
Diameters of fifth of fourth row { anteroposterior	3
Diameters of fifth of fourth row { transverse	7

The horizon of this species is not exactly known, but it is probably Lower Cretaceous. It gives me much pleasure to dedicate it to Dr. E. T. Dumble, Director of the Geological Survey of Texas.

IV. Triassic or Bokum Beds.

The fossils from these beds present a general similarity to those obtained elsewhere in the Trias. Fragments of large Stegocephali are abundant, and Crocodilians of the Parasuchian group are still more so. Teeth like those of the Eastern Clepsysaurus and Zatomus also occur. The number of identifiable species is small, and the best preserved of these is a new representative of the genus Episcoposaurus Cope, already described from the Triassic bed of New Mexico.*

Episcoposaurus haplocerus sp. nov.

I refer to this species the following pieces which were found together by Mr. W. T. Cummins. A dorsal and probably two caudal vertebræ; a scapula of the right side; a few fragments of ribs, and about thirty dermal bones. The generic characters and those of higher value may be first described.

The single dorsal vertebra is from the posterior part of the series. Its articular surfaces are shallowly concave. The neural arch is not entirely coössified, part of the sutural surface being visible in the fracture, from which the neurapophysis has been broken. There is a rib-facet at each end. The smaller, which is longer than deep, is continuous at an open angle with the tubercular articulation of the short diapophysis. The other is longer than deep, lenticular in outline, and terminates acutely above. The scapula is massive, and the inferior extremity is thinned below and turned obliquely inwards. No proscapula. The coracoid facet is not large, and is separated by an angle from the glenoid cavity. The ribs are flat, not very wide, and have one subacute edge. The head of one is attached to the dorsal vertebra, above described. The capitular and articular surfaces are subequal and are separated by an angle. The dermal bones are thick and are united by suture, so as to form transverse bands across the body; but are not united in the anteroposterior direction. Some

*Proceedings Amer. Philos. Soc., 1887, p. 213.

of them have median tuberosities, which are developed in others into horn-like spines. These form rows on the opposite sides of the middle line, as they are unilaterally symmetrical.

Char. specif.—The dorsal vertebra above referred to has the centrum slightly wider than deep. Its inferior surface is contracted on each side, and is slightly concave on the middle line. The surface is smooth. The diapophysis is robust, subtriangular in section, and it does not project freely beyond the centrum. The centrum of a caudal vertebra with chevron facets, is deeper than wide, and has robust diapophyses, which spring principally from the centrum. The outline of the articular face is a hexagon elongate vertically. This is partly due to the broad truncation of the inferior face. Concavity of centrum slight.

Measurements of Vertebræ and Ribs.

		MM.
Diameters of dorsal	anteroposterior	66
	vertical	64
	transverse	75
Diameters of caudal	anteroposterior	52
	vertical	59
	transverse	51
Vertical diameter of head of rib attached to dorsal, above mentioned		46
Transverse diameter of capitulum of do		26
Transverse diameter of shaft of another rib		40
Thickness of shaft of another rib		15

The section of the scapula is everywhere lenticular. It is robust, rather short, without much constriction at the base, and but a moderate expansion above. A distinct clavicular facet is not preserved. The incurvature of the inferior surface is most abrupt anteriorly, the angle there amounting almost to a tuberosity.

Measurements of Scapula.

		MM.
Length on external face from superior border to line of superior edge of glenoid cavity		141
Diameters at narrowest part	anteroposterior	60
	transverse	32
Diameters glenoid cavity	vertical	52
	transverse	40

The *dermal bones* are subquadrate in form, and have sutures on two opposite sides and thin edges on the other opposite sides. The inferior surface is more or less concave from one sutural border to the other. They are all coarsely pitted, but the pits are reduced in size towards the edges in some of the plates. In many of the plates there is a prominent obtusely conic tuberosity placed unsymmetrically near the centre or edge of the

plate. This tuberosity is in some of the plates developed into a prominent spine or horn, which has an anteroposteriorly oval section. The surfaces of the tuberosities are punctate. These horns are placed on the sides, and probably not far from the median line, since they form with the adjacent tuber-bearing plates a strong angle, such as would be necessary to enclose the neural spines of the vertebral column. It is also not certain whether these spines were on the dorsal, cervical or caudal regions, or whether they were on all of them. The plates adjacent to those bearing spines are the most robust. The spines are gently curved, probably backwards.

Measurements of Dermal Plates.

		MM.
Diameters of plate without knob	anteroposterior	90
	transverse	78
	vertical at suture	18
Diameters of plate with knob	anteroposterior	100
	transverse	70
	vertical at suture	37
Diameters of plate with spine	anteroposterior	115
	transverse (chord)	65
	vertical at suture	35
Elevation of spine of plate last, measured from base (apex restored)		190
Diameters of spine at base	anteroposterior	95
	transverse	65
Diameters of spine 45 mm. below apex	anteroposterior	30
	transverse	20
Diameter of pits on flat bone		5
Diameter of pits on knobbed bone		9

In *comparison* with the only species of the genus known thus far, the *E. horridus*, from the Triassic bed of New Mexico, the present species has the tuberosities and horns of a different shape. In that species the former are compressed and keel-like, and the horns are also compressed, having an edge in front and a triangular section. The individual which served as the basis of the description of the *E. horridus* is also of rather smaller size than the present one.

On Tiaporus, a New Genus of Teiidæ.

By E. D. Cope.

(*Read before the American Philosophical Society, March 4, 1892.*)

TIAPORUS FULIGINOSUS, gen. et sp. nov.

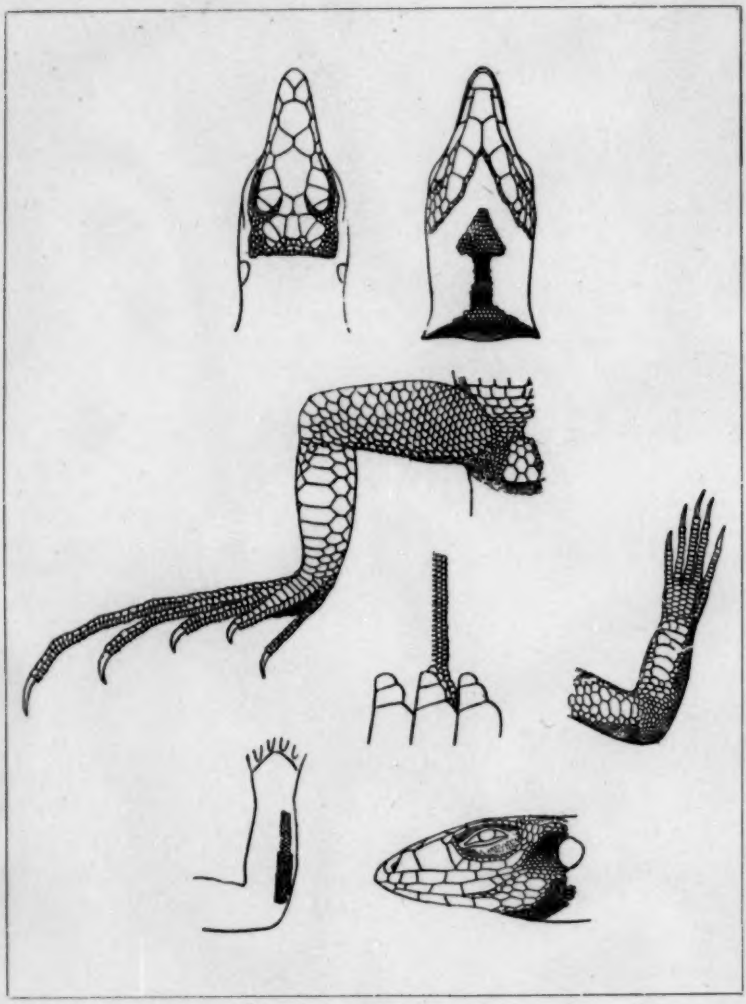
Char. gen.—Tongue cylindric and sheathed at the base; no femoral pores; abdominal scales smooth; a cervical collar fold; tail cylindric. Digits 5–5.

This form is identical with Amiva, except in the absence of femoral pores. Monoplocus Gthr. has no femoral pores, but the tongue is not sheathed, and the abdominal scales are keeled.

Char. specif.—The squamous surface of the tongue is ovate posteriorly and not notched. The apex of the tongue is deeply bifurcate. The teeth of the maxillary bone are compressed, and have a principal compressed apex, and one or two denticles of the edges near the base. The rosettes of scales, which in other genera surround the femoral pores, are present, but the pores are absent.

The animal is about the size of the *Amiva corvina* Cope. The dorsal scales are minute, measuring .02 mm. The abdominal plates are in twelve longitudinal and thirty-two transverse rows. They are smooth, and those of the external row are smaller than the others. The nostril is on the suture between the nasal plates. The pariëtals are divided into two and sometimes into three plates, the internal of which is wider than the interpariëtal. The latter is smaller than each frontopariëtal. Supraorbitals, four; supraciliaries, six; no frenoorbital. Head rather elongate and acuminate; labials $\frac{6}{6}$; infralabials, three large and two small, separated from labials by two rows of large scales. A few rows of scales on the middle of the mesoptychium equal those of the gular region, which are a little larger than those of the neck, which are equal to those on the posterior part and edge of the gular fold. The brachial scales are not large, and are in three or four rows, separated by small scales from a few small postbrachial scales near the elbow. The antebrachial scales are not continuous with the brachials, and are in one large external and two or three smaller internal rows. No postantebrachials. Femorals in 13–14 rows; the third from the front large; the posterior six rows not imbricate. Tibial scales in five rows, the external much larger. Anal plates with five or six large marginals, and five in front of them, four arranged round a small central one. Caudal scales narrow, numerous, not oblique, keeled, but not uncinate. No spurs.

Color above brown, sometimes with a lead-colored shade. Below lead color, with an olive tinge, to nearly black. A black band from temporal region to above femur present in all the specimens. In three specimens there are traces of one or two brown bands on the middle dorsal region



Tiaporus fuliginosus Cope.

anteriorly; in one of these also an interrupted black lateral band below the one already described. Below this there are in the same specimen two rows of blackish spots on the sides, the inferior on the lateral ventral scales. In a ♀ there is a row of small pale spots above and below the superior lateral black band.

Total length, 310 mm.; length to angle of mandible, 30 mm.; do. to collar, 38 mm.; do. to axilla, 45 mm.; do. to vent, 108 mm.; do. of fore-leg, 40 mm.; do. of forefoot, 17 mm.; do. of hind leg, 83 mm.; do. of hind foot, 47 mm.

This remarkable species has no particular resemblance to any known species of Amiva or Cnemidophorus. Four specimens, No. 14,710 U. S. National Museum Register, from Swan Island in the Caribbean Sea Collected by Charles Townsend.

Swan Island is off the northeastern coast of Honduras, at a distance of about two degrees of latitude. It is about five degrees west by south of Jamaica. It was visited by the U. S. Fish Commission steamer *Albatross*, and Mr. Townsend, the naturalist of the expedition, obtained this species with several others. The present form is related to Amiva as Monoplocus is to Centropyx.

Explanation of Plate.

Fig. 1. Head profile: *a*, from above; *b*, from below; fig. 2, anterior limb from above; *b*, forearm from below; fig. 3, hinder limb with anal region from below; fig. 4, portion of side of body.